TECHNICAL REPORT 040

# Garry Oak (*Quercus garryana*) Plant Communities in British Columbia: A Guide to Identification

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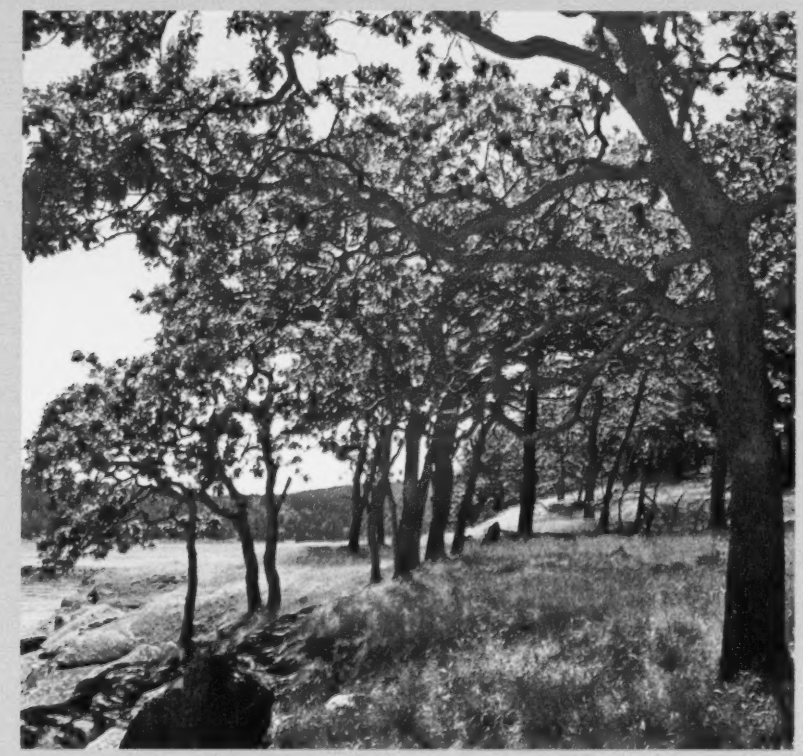

BRITISH COLUMBIA

Ministry of Forests and Range
Forest Science Program

# **Garry Oak (*Quercus garryana*) Plant Communities in British Columbia:** A Guide to Identification

Wayne R. Erickson and Del Meidinger

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## SCOPE

This field guide covers the native plant communities with a component of Garry oak (*Quercus garryana*) in British Columbia. It is a guide to identification of these communities, which can be applied to the woodlands, savannah, meadow, and rock outcrops within and near the zone of influence of oak canopy. The guide does not cover very specific occurrences, such as vernal pools, or the broader set of associated ecosystems that help form the Garry oak landscape. In the background work (Erickson 1996, 1998, 2002b) on which this guide is based, Garry oak ecosystems were interpreted as a climax conditioned by a natural disturbance regime. This would occur within a smaller geographic scale than that addressed by the provincial biogeoclimatic ecosystem classification (BEC). In the BEC context they are placed as seral in comparison to climax Douglas-fir forest on circum-mesic sites, and could possibly be considered as a disclimax. This guide does not focus on management, which is addressed only via rankings and comments under each plant community. We have provided both scientific and common names to meet the diverse interests of guide users.

## HOW TO USE THE FIELD GUIDE

*Follow these steps to use this field guide:*

1. Use the flow charts to identify the plant association or plant association site.
2. Follow the colour key and page reference to the plant association section.
3. Use the flow charts at the start of each section to identify the plant association, subunits, or sites.
4. Read the selected description to confirm identity.
5. Record the plant association and community unit and relevant interpretations, refining as justified.

Steps 1–3 can be completed using the information found in Appendix 1. We suggest that the reader also review the descriptions.

*Mount Galiano Garry oak landscape.*

*Reynolds Point Garry oaks.*

## ACKNOWLEDGEMENTS

Thanks to Ted Lea, Andy MacKinnon, and Don Heppner for reviewing this field guide; Paul Nystedt and Rick Scharf for production services; and our employer, the British Columbia Ministry of Forests and Range, for its support. It is never too late to thank the primary author's thesis committee at the University of Victoria, especially Mike Edgell and Nancy Turner, as all of the data originated in this work. Our chance to complete this report has benefited from the interest and efforts of Garry Oak Ecosystem Recovery Team members Tim Ennis, Andrew MacDougall, Shyanne Smith, Ted Lea, and Louise Goulet in particular.

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Increasing awareness and concern about the decline of Garry oak plant communities have now attracted considerable interest from naturalists, the public, and the scientific community. These special ecosystems have now been identified as a focus for national recovery planning.

The Garry oak landscape corresponds to a rainshadow zone in the lee of the Olympic and Vancouver Island mountains with a mild, winter-wet, summer-dry modified Mediterranean climate. It is an area of inner coast and islands with elevations ranging from sea level to 550 m on ridge tops and mountains (Figure 1). Geologically, this region is complex, being composed of a folded and faulted sedimentary basin, metamorphic contact zones with exotic terranes, granitic intrusions, and both glacial and colluvial surface overlays. Soils have been organically enriched with Ah horizons and are often shallowly underlain by bedrock. Persistent exposure to insolation, wind, or seaspray is common. Periodic fire is thought to have typified the natural disturbance regime, as in other oak woodlands of the Pacific Northwest.

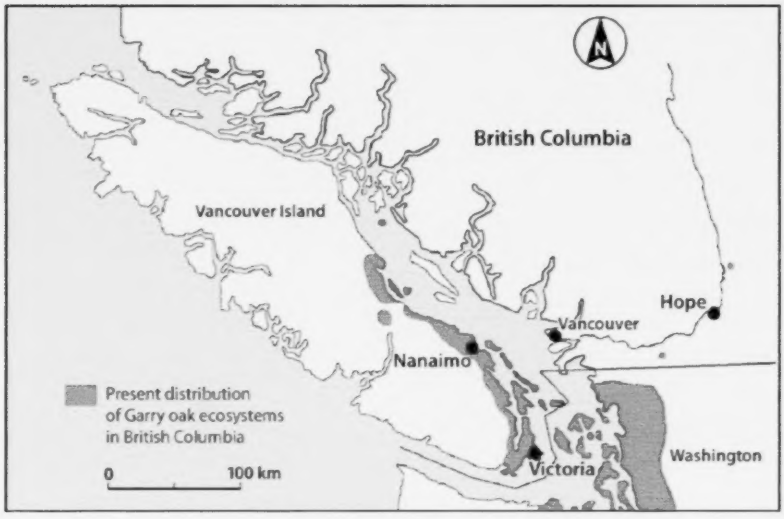
At a landscape scale, site-level moisture regime, elevation, and amount of surface bedrock (exposed or with shallow humus) have been identified as the most important variables in accounting for the plant community gradient (Erickson 1996). At the plant community scale, the most important distinguishing variables were site mineral soil exposure , soil coarse fragments, and geographic area, followed by topographic drainage, soil texture, depth to bedrock, percent downed wood, and elevation (Erickson 2002b). After grazing, lack of fire, and the cool wet climate following the late 1800s, shrubs and Douglas-fir (*Pseudotsuga menziesii*), which here are particularly represented by the community types Qgos-c10 and Qggc-c13, encroached considerably into circum-mesic sites of the Garry oak habitat.

An ecosystem guide should help to identify these plant communities and provide a focus for their appreciation and management. This guide describes native plant communities, which are dominated by and named for native plant species. It combines the detail developed by Erickson (1996, 1998) with a more generalized treatment, via the introduction of seven plant associations. Thus, many of the broad landscape and ecosystems are addressed along with the mosaic of small patch communities and subcommunities in the original work.

Text and tables give an overview of these types and communities, followed by flow charts for identification. The flow charts use differences in plant species composition in combination with landscape characteristics, physiognomy, and site features. A one-page description follows for each plant community, presented within the structure of its plant association. The order of the plant associations ranges generally from driest to wettest. Appendices give other relevant information such as a list of the invasive alien communities (equivalent to the first- and second-order disturbance communities from Erickson 1996, 1998). Note that a report with more detailed results and data is currently in preparation (Erickson [2007]).

### Overview of Garry Oak Communities

Communities in this guide have Garry oak present at some level of cover, ranging from light, open, often shrubby cover to parkland savannah form, closed woodland, and even shrub thickets. This range takes us from the ex-




posed sea coast to isolated patches on the higher promontories. The isolation of these oaks is taken to be a remnant of biogeographic history in which these open ecosystems have retracted from a former wide distribution at the height of the post-glacial warm dry and warm wet eras. The relationship between community and environment has been complicated by this history, and is also influenced by the past fire management practices of indigenous First Nations people.

Fully developed Garry oak landscapes no longer remain, as most have been fragmented by development or conifer encroachment. Especially relevant is the loss throughout the lower Saanich Peninsula, formerly the centre of concentration for these ecosystems in British Columbia. Patterns of the communities are often therefore patchy, variable, and incomplete. Outstanding communities include the early season category, usually dominated by camas[1] (common camas [*C. quamash*] and great camas [*C. leichtlinii*] or those dominated by native grasses such as Roemer's [Idaho] fescue [*Festuca roemeri, F. idahoensis*] or blue wildrye [*Elymus glaucus*]). This guide does not cover either extreme without Garry oak: really wet (hygric to hydric) sites forming part of the landscape catena; or very dry open, treeless sites dominated by bryophytes. However, Garry oaks are typical in riparian edges, and an overview of pocket grasslands in the Garry oak landscape can be found elsewhere (Erickson 2003). Also a range of ecosystems, such as the larger open meadows, coastal bluffs, and vernal pools associated with the Garry oak landscape, are not covered here. Note that invasive alien plant communities (Appendix 4) dominate much of the remaining Garry oak landscape, making the native communities rare and even more isolated.

Related communities both inside and outside British Columbia were originally compared by Erickson (1996, 1998). Recently, Washington's Natural Heritage Program has published reports and fact sheets on plant associations for all of the Puget Trough bioregion, including woodlands and savannahs, "balds," and bluffs (Chappell 2006a, 2006b).

1 Provincial standard common names and scientific names are used in this guide, but common names are emphasized. The reader can refer to the same basic material in Erickson (1996, 1998). Scientific taxonomy here has been updated for consistency with the Douglas et al. (1998–2002) series. Any exceptions are noted in the text.

This guide identifies and classifies stands or environmental sites into plant communities. Classification provides a common language for referring to sites, so that distribution, threats, and rarity can be discussed, along with the exchange of management experience. Classifications communicate ecological information and increase understanding, which allows managers and naturalists to become oriented more quickly to a new landscape. Thus the focus of management can be refined so efforts can be applied where they make the most difference.

The purpose of this guide is to standardize the use of plant communities in conservation and recovery of the Garry oak habitat, and thus to move toward an ecosystem approach. Standardized communities can provide a basis for mapping and inventory. The guide is also intended to provide targets for Garry oak habitat restoration, and could help identify reference communities, which are then monitored to detect long-term ecological trends.

Compared with previous work, this guide introduces the plant association as a new, simplified level. The seven plant associations presented here are subdivided into 16 plant community types and six subcommunities. Most are similar to those in Erickson (1996, 1998), with changes mainly in the level of classification. Categories are maintained for bedrock outcrop and colluvial, early and late season (phenological), grassy, and shrub thicket communities. Native communities from each of these categories are included in the one-page descriptions. Alien (non-native) species are designated with an asterisk (*) in these descriptions. Sections include: a general description of sites, soils, stands, and vegetative composition; a chart with geographic area against site moisture regime; comments including equivalent communities and succession to native or invasive alien communities; a chart with the relative importance value of the major understorey plant species; and a chart with management rankings (see also Appendix 8). More details on these topics, especially on management, are in previous work. Note that site moisture regime is generalized in the charts, so there may be occurrences outside the range shown. This guide can be updated and refined over time through use and testing, together with the incorporation of local knowledge on plant communities.

### Plant Community Classification Levels

Three classification levels, with three parallel subdivisions, are used for the plant communities in this guide. Plant associations are the most general level, as they may represent amalgamations of communities; plant community types are intermediate; and plant subcommunities can be very specific for

| Plant association | Outline of the Plant Community Classification | | |
|---|---|---|---|
| Plant community type | Phenological plant community type | Native successional community type | Invasive alien community type |
| Plant subcommunity | Phenological plant subcommunity | Native successional subcommunity | Invasive alien subcommunity |

one type of site and relative uniformity of species composition. Working definitions follow in the second table.

The phenological designation used here could mislead those used to other ecosystems, because this stage of spring is the time of peak growth in Garry oak ecosystems. Successional relationships are indicated in these tables for each plant association. Native successional communities still have their native plant composition and reflect the recovery stages that occur after small-scale disturbances. Invasive alien communities have lost this composition due to invasions of alien (non-native, introduced) species. They are listed but not described here. Erickson describes these communities within the first- and second-order disturbance communities in Erickson (1996, 1998).

**Definitions of the Plant Community Classification Units**

| | |
|---|---|
| **Plant association** | Major vegetation unit characterizing a habitat and forming part of a simplified recognizable sequence |
| **Plant community type** | A subunit with more specific ecological or geographic occurrence |
| Phenological plant community type | A subunit, usually with spring forbs, having a relatively short temporal identification window |
| Native successional plant community type | A subunit representing a segment of succession after minor disturbance and recovery |
| Invasive alien plant community type | A subunit that has been very disturbed and is dominated by invasive alien plants (invading, non-native species) |
| **Plant subcommunity** | A subunit with more specific ecological or geographic occurrence |
| Phenological plant subcommunity | A subunit, usually with spring forbs, having a relatively short temporal identification window |
| Native successional plant subcommunity | A subunit representing a segment of succession after minor disturbance and recovery |
| Invasive alien plant subcommunity | A subunit that has been very disturbed and is dominated by invasive alien plants (invading, non-native species) |

Quantitative comparisons of similarities and differences heavily influence placement within these units (Appendix 5). The keys in Appendices 1 and 2 use a facultative, rather than a dichotomous, approach and therefore promote a "best-fit" solution. Erickson (2002b) concluded that a 1:1 relationship with environment was not possible and there would always be an element of unpredictability. Therefore, in the flow charts and keys, vegetation precedes environment. In the descriptions, the term "important" is used when a species has a cover class ≥ 3 (11%+), with lesser importance below this, and a minor or "present" designation for class 1 (0–1%). Each community has charts with relative importance values that combine constancy (across the plots) times mean cover (class mid-point) to give one index value.

**Management Rankings**

In the descriptions, each plant community is given a management ranking in table form for eight sets of interpretations: preservation priority, regeneration potential, aesthetic appeal, susceptibility to disturbance, prescribed fire potential, threats, restoration potential, and restoration priority. The rankings are then assigned as a range between very low and very high (see Appendix 8). Each is a relative ranking within the interpretation category and the range of communities shown here plus the invasive alien communities of Garry oak habitat. These interpretations are brought in directly from Erickson (1996), where detailed discussions of each can be found. The interpretations vary from expert opinion, informed by observations from the sampling effort, to data-assisted interpretations.

**Geographic Areas**

Five geographic area categories were used to describe distribution: western shore (west of the Saanich Peninsula, out to East Sooke); Saanich Peninsula; southern Gulf Islands (Saltspring to Galiano and the islands south); northern Gulf Islands (north of this to Denman and Hornby islands); and Nanaimo–Duncan (north to Nanoose Bay and south to either the Saanich Peninsula or western shore areas).

**List of Garry Oak Plant Associations**

Garry oak – Grey rock-moss – Wallace's selaginella plant association
Garry oak – Broom-moss plant association
Garry oak – Hairy honeysuckle plant association
Garry oak – Roemer's fescue plant association
Garry oak – Common camas – Blue wildrye plant association
Garry oak – Great camas – Blue wildrye plant association
Garry oak – Oceanspray – Common snowberry plant association

This guide includes seven plant associations; 17 community types; and six subcommunities. This total is up from previous work (Erickson 1996, 1998) because of the addition of the plant association level. However, this addition also simplifies for applications that require a general approach (e.g., mapping at a scale that prevents detail). All full plant associations with their native communities are listed in Appendix 3. The other communities are listed and described within the coloured section for each plant association. A synopsis of the key to the plant association follows, along with flow charts covering both vegetation and sites (Appendix 1). Community designations below the plant association maintain the names and alphanumeric codes (via the last three digits) from the previous classification, for example, as highlighted: Qgbm-c11 Garry oak – Broom-moss – Small-leaved montia (*Quercus garryana – Dicranum scoparium – Montia parvifolia*) community type. The level of some communities and subcommunities has changed from previous work.

**Synopsis of the Key to Garry Oak Plant Associations**

**Mostly native dominant species**

**Bedrock landscapes**

Warm aspects[2]: grey rock-moss – Wallace's selaginella

Cool aspects: broom-moss

Dry colluvial sites: hairy honeysuckle

**Cool or wet sites**

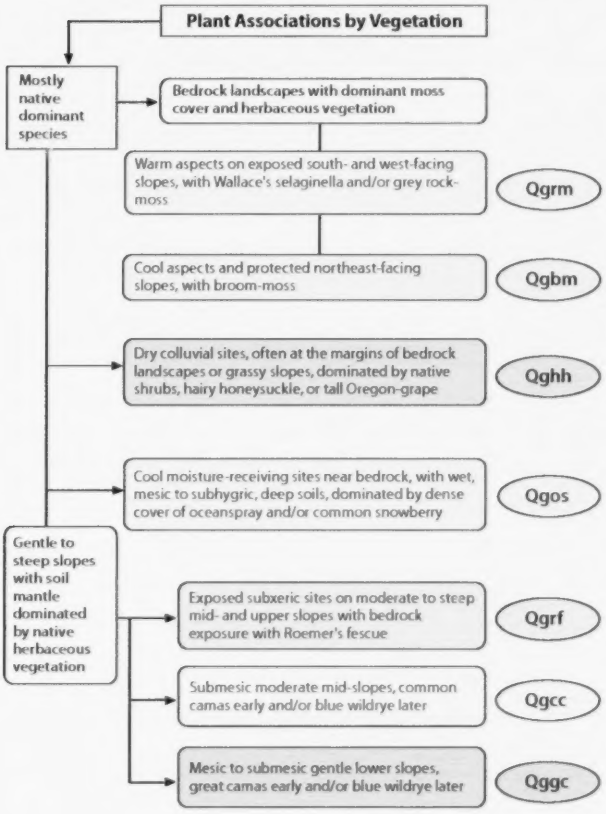
Dense cover of native shrubs, oceanspray – common snowberry

**Gentle to steep slopes with native herbaceous vegetation**

Exposed subxeric sites: Roemer's fescue

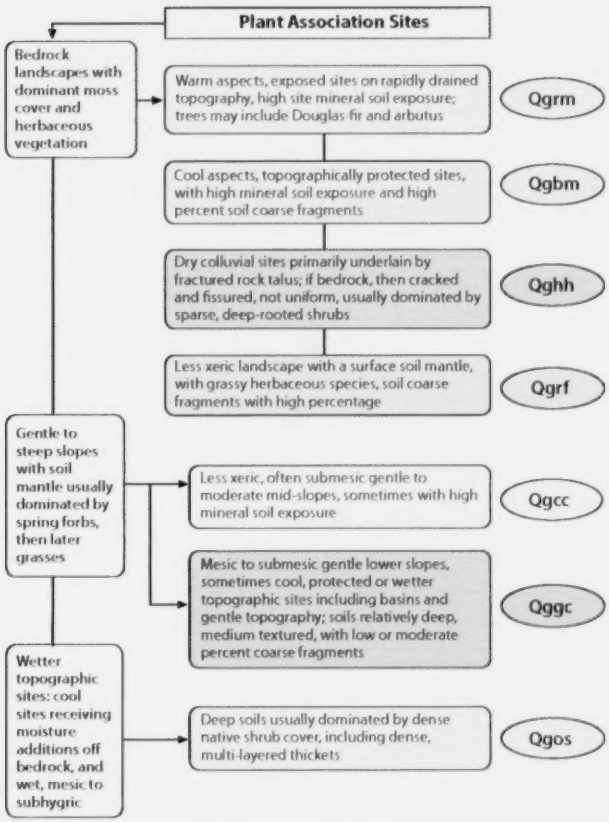
Moderate submesic sites: common camas – blue wildrye

Lower slope mesic sites: great camas – blue wildrye


Plant Associations by Vegetation
Mostly native dominant species
Bedrock landscapes with dominant moss cover and herbaceous vegetation
Warm aspects on exposed south- and west-facing slopes, with Wallace's selaginella and/or grey rock-moss
Qgrm
Cool aspects and protected northeast-facing slopes, with broom-moss
Qgbm
Dry colluvial sites, often at the margins of bedrock landscapes or grassy slopes, dominated by native shrubs, hairy honeysuckle, or tall Oregon-grape
Qghh
Cool moisture-receiving sites near bedrock, with wet, mesic to subhygric, deep soils, dominated by dense cover of oceanspray and/or common snowberry
Qgos
Gentle to steep slopes with soil mantle dominated by native herbaceous vegetation
Exposed subxeric sites on moderate to steep mid- and upper slopes with bedrock exposure with Roemer's fescue
Qgrf
Submesic moderate mid-slopes, common camas early and/or blue wildrye later
Qgcc
Mesic to submesic gentle lower slopes, great camas early and/or blue wildrye later
Qggc

Notes: Defining species have at least 11% cover. Early season is April 15 to May 15. Other details are in the text and the full keys at the back.

2 "Garry oak" and "plant association" are left out of the synopsis for brevity.


Plant Association Sites
Bedrock landscapes with dominant moss cover and herbaceous vegetation
Warm aspects, exposed sites on rapidly drained topography, high site mineral soil exposure; trees may include Douglas-fir and arbutus
Qgrm
Cool aspects, topographically protected sites, with high mineral soil exposure and high percent soil coarse fragments
Qgbm
Dry colluvial sites primarily underlain by fractured rock talus; if bedrock, then cracked and fissured, not uniform, usually dominated by sparse, deep-rooted shrubs
Qghh
Less xeric landscape with a surface soil mantle, with grassy herbaceous species, soil coarse fragments with high percentage
Qgrf
Gentle to steep slopes with soil mantle usually dominated by spring forbs, then later grasses
Less xeric, often submesic gentle to moderate mid-slopes, sometimes with high mineral soil exposure
Qgcc
Mesic to submesic gentle lower slopes, sometimes cool, protected or wetter topographic sites including basins and gentle topography; soils relatively deep, medium textured, with low or moderate percent coarse fragments
Qggc
Wetter topographic sites: cool sites receiving moisture additions off bedrock, and wet, mesic to subhygric
Deep soils usually dominated by dense native shrub cover, including dense, multi-layered thickets
Qgos

*Large Garry oak trunk, Elkington.*

*Garry oak canopy.*

## Qgrm Garry oak – Grey rock-moss – Wallace's selaginella

*Quercus garryana – Racomitrium canescens – Selaginella wallacei*—plant association

### Key Features

- Bedrock landscapes or other rocky xeric landscapes
  - Exposed sites on rapidly drained topography, high site mineral soil exposure
- Warm aspects on south- and west-facing slopes
- Prominent moss cover and herbaceous vegetation
  - Trees if present may include Douglas-fir and arbutus
  - Grey rock-moss dominant: Wallace's selaginella and/or grey rock-moss ≥ 11% cover, the other of which > 2% cover

This plant association may degrade into one of the following invasive alien communities (which are listed, but not described here):

1a. barren fescue*[3] and/or grey rock-moss ≥ 11% cover, the other of which > 2% cover, Scotch broom* often ≥ 11% cover: Garry oak – Grey rock-moss – Barren fescue* (*Vulpia bromoides*) (c50, c3 in Erickson 1996, 1998)

1b. Scotch broom* and grey rock-moss ≥ 26% cover, > other species, cheatgrass often ≥ 11% cover: Garry oak – Scotch broom* – Grey rock-moss (c17, c22 in Erickson 1996, 1998).

Orchardgrass is limited on these severe sites. With the exceptions above, Scotch broom* cannot readily persist or remain highly dominant.

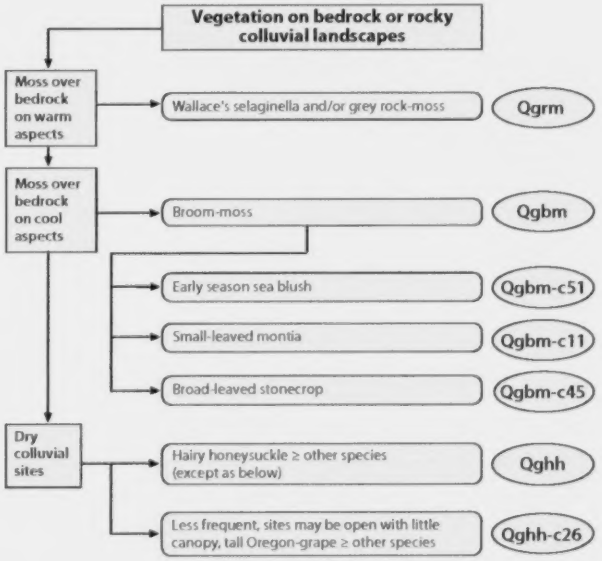
| Plant community types | None[4] | |
|---|---|---|
| Plant subcommunities | None | |
| Phenological stages | None | |
| Native successional stages | None | |
| Invasive alien subcommunities | Garry oak – Grey rock-moss – Barren fescue* c50 (includes Garry oak – Scotch broom* – Grey rock-moss – Annual fescue* – Hairgrass* c3) | Garry oak – Scotch broom* – Grey rock-moss c17 (includes Garry oak – Scotch broom* – Grey rock-moss – Cheatgrass* c22) |

3 Asterisk is used to designate alien (exotic, non-native) species.

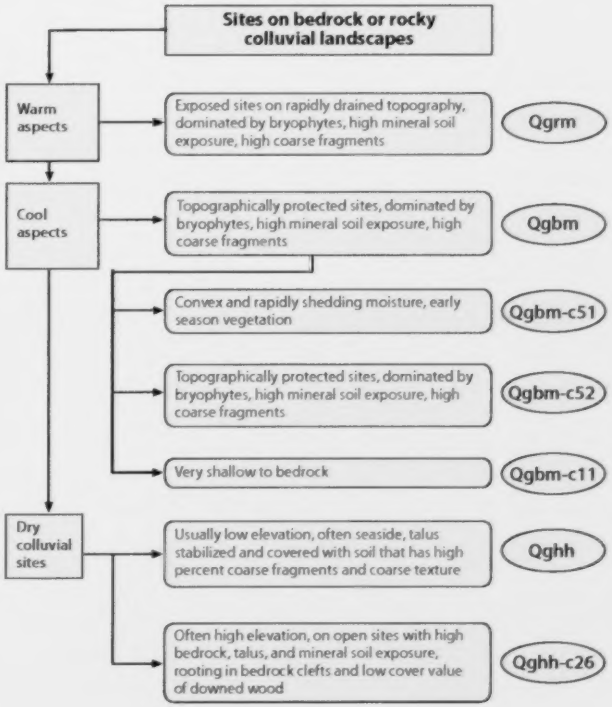
4 None in this context means none identified.

This plant association was recognized as a plant community (c46) in Erickson (1996, 1998). The combination and designation of the invasive alien (c50, c3; plus c17, c22) subcommunities are based on high Index of Similarity (IS) (Appendix 5) comparison results: IS > 1.36 and the IS value of c3 versus c17 (Erickson (1996).

Full keys are found in Appendices 1 and 2. Flow charts to bedrock landscape plant communities follow.




Notes: Defining species have at least 11% cover. Early season is April 15 to May 15. Other details are in the text and the full keys at the back.


Sites on bedrock or rocky colluvial landscapes
Warm aspects
Exposed sites on rapidly drained topography, dominated by bryophytes, high mineral soil exposure, high coarse fragments
Qgrm
Cool aspects
Topographically protected sites, dominated by bryophytes, high mineral soil exposure, high coarse fragments
Qgbm
Convex and rapidly shedding moisture, early season vegetation
Qgbm-c51
Topographically protected sites, dominated by bryophytes, high mineral soil exposure, high coarse fragments
Qgbm-c52
Very shallow to bedrock
Qgbm-c11
Dry colluvial sites
Usually low elevation, often seaside, talus stabilized and covered with soil that has high percent coarse fragments and coarse texture
Qghh
Often high elevation, on open sites with high bedrock, talus, and mineral soil exposure, rooting in bedrock clefts and low cover value of downed wood
Qghh-c26

*Galiano Bluffs, Galiano Island.*

*Bodega Ridge, Galiano Island.*

*Typical grey rock-moss outcropping, Government House.*

## Qgrm Garry oak – Grey rock-moss – Wallace's selaginella

*Quercus garryana – Racomitrium canescens – Selaginella wallacei* —plant association

### General Description

This plant association is infrequently distributed throughout the range with the exception of the northern Gulf Islands but its invasive alien subcommunities are widespread. The Garry oak – Grey rock-moss – Wallace's selaginella plant association occupies warm aspects of exposed (insolation and wind), rapidly drained topography, underlain by uniform bedrock. These sites have high site mineral soil exposure. They usually occur at high elevations on very xeric, very steep southwest, sometimes convex, slopes. Plots have high coarse (conglomerate, sandstone) bedrock exposed or underlying shallow, rocky, sandy loam to loam textured, gravelly Orthic Regosols or (poorly developed) Orthic Dystric Brunisols. There is sometimes still a deep, dark Ah horizon with Rhizomull surface humus. Oaks of various diameters can be found in a tree or tall shrub canopy. Douglas-fir (*Pseudotsuga menziesii*) or arbutus (*Arbutus menziesii*) may be present, with lesser cover, on many sites in these layers. Moderately well-stocked oak saplings are found on most sites and on all sites for seedlings. Grey rock-moss (*Racomitrium canescens*[5]) and Wallace's selaginella (*Selaginella wallacei*) are important on all sites; California brome (*Bromus carinatus*) and blue wildrye (*Elymus glaucus*) are of lesser importance. Juniper haircap moss (*Polytrichum juniperinum*) is important on most sites, with many-flowered wood-rush (*Luzula multiflora*) and barren fescue* (*Vulpia bromoides*) less so. Yarrow (*Achillea millefolium*), small-flowered birds-foot trefoil (*Lotus micranthus*), and small-flowered blue-eyed Mary (*Collinsia parviflora*) are of lesser importance. Also present are woolly eriophyllum (*Eriophyllum lanatum*), early hairgrass* (*Aira praecox*), hawksbeard* (*Crepis* sp.), sheep sorrel* (*Rumex acetosella*), and goldenback fern (*Pentagramma triangularis*).

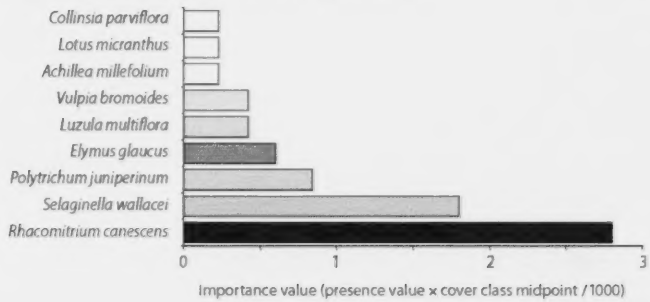
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

This plant association represents the most xeric plots in that survey. The same community occurs frequently on openings without Garry oak. This plant association is distinguished by very high bedrock exposure and high-elevation occurrence on very steep, convex, south- and west-facing slopes. With disturbance it is suggested to convert in sequence to the invasive alien grey rock-moss subcommunities (Garry oak – Grey rock-moss – Barren fescue* [c50] and Garry oak – Scotch broom* – Grey rock-moss [c17], which now include the previous c3 and c22 of Erickson 1996, 1998). Similar communities occur very frequently on openings without Garry oak. The succession above should reverse, as the Scotch broom* communities are not expected to persist on these severe sites.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | High |
| Aesthetic appeal | High |
| Susceptibility to disturbance | Very high |
| Prescribed fire potential | Low |
| Threats | Moderately high |
| Restoration potential | Moderately high |
| Restoration priority | High |

### Relative Importance Value of Major Species




5 The old spelling of this genus, Rhacomitrium, is used in the "relative importance" charts.

## Qgbm Garry oak – Broom-moss

*Quercus garryana – Dicranum scoparium*—plant association

### Key Features

- Bedrock landscapes
- Prominent moss cover and herbaceous vegetation
- Cool aspects and protected north- and east-facing slopes
- Broom-moss ≥ 11% cover

The Garry oak – Broom-moss plant association consists of three community types (below), including one designated as phenological (early season). The general plant association itself can sometimes be assigned as native successional when its occurrence results from the depletion of forbs by disturbance.

| Plant community types | Garry oak – Broom-moss – Small-leaved montia Qgbm-c11[6] | Garry oak – Broom-moss – Broad-leaved stonecrop Qgbm-c45 |
|---|---|---|
| Phenological community types | Garry oak – Broom-moss – Sea blush Qgbm-c51 | |
| Native successional community types | None | |
| Plant subcommunities | None | |
| Invasive alien stages | None | |

The Garry oak – Broom-moss plant association was recognized as the typic subcommunity (c52) of this group in Erickson (1996, 1998). Scientific names of the community types are as follows:

The Garry oak – Broom-moss – Small-leaved montia community type Qgbm-c11: *Quercus garryana – Dicranum scoparium – Montia parvifolia* community type.

The Garry oak – Broom-moss – Sea blush community type Qgbm-c51: *Quercus garryana – Dicranum scoparium – Plectritis congesta* community type.

The Garry oak – Broom-moss – Broad-leaved stonecrop community type Qgbm-c45: *Quercus garryana – Dicranum scoparium – Sedum spathulifolium* community type.

Flow charts to the plant communities of bedrock landscapes are found under Qgrm (page 9). Full keys are found in Appendices 1 and 2.

*Sea blush, Thetis Park Nature Sanctuary Association.*

*Small-leaved montia, View Royal Park.*

6 Community designations below the plant association maintain the names and alphanumeric codes (via the last three digits) from Erickson (1996, 1998), for example, as highlighted: Qgbm-c11 Garry oak – Broom-moss – Small-leaved montia (*Quercus garryana – Dicranum scoparium – Montia parvifolia*) community type.

## Qgbm Garry oak – Broom-moss

*Quercus garryana – Dicranum scoparium*—plant association

### General Description

This plant association is infrequently distributed throughout the range, except on the main Gulf Islands. These are cool aspect, convex but topographically protected sites on uniform bedrock, with high values for mineral soil exposure and coarse fragments within the soil. Some sites may be south facing, with insolation and wind exposure. They have been rated as subxeric to very xeric in their moisture regime. Exposure of bedrock (mainly coarse sandstone or granite) and surface rocks is often high. Where deeper, soils are classified as Orthic Sombric Brunisols, but they often have only a shallow Ah horizon and are Regosols. Rhizomull humus overlies dark Ah horizon. Surface soils are sandy loam to silt loam in texture and are chiefly gravelly with low percent coarse fragments. Trees are mostly of medium diameter[7] and are found as a tree canopy. Regeneration is moderately well-stocked saplings on all sites and lightly stocked seedlings on some sites. Broom-moss (*Dicranum scoparium*) is important on all sites. Species important on most sites include barren fescue* (*Vulpia bromoides*), sweet vernalgrass* (*Anthoxanthum odoratum*), and grey rock-moss (*Racomitrium canescens*). Common snowberry (*Symphoricarpos albus*), hairy honeysuckle (*Lonicera hispidula*), blue wildrye (*Elymus glaucus*), Roemer's fescue (*Festuca roemeri*), small-flowered birds-foot trefoil (*Lotus micranthus*), and cleavers[8] (*Galium aparine*) are of lesser importance on most sites.

| *Moisture regime* | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| *very xeric* | | | | | |
| | | | | | |
| *subxeric* | | | | | |
| | | | | | |
| *mesic* | | | | | |
| | | | | | |
| *subhygric* | | | | | |

7 See Appendix 8 for a description of diameter classes.

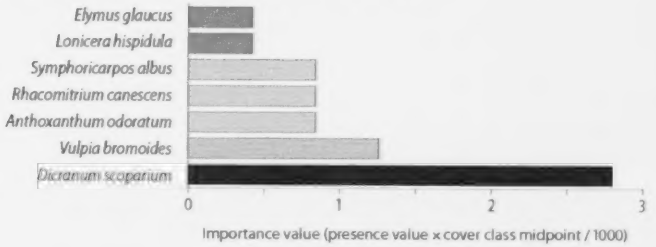
8 Cleavers is designated a native species in provincial standards for taxonomy. We recognize that some have interpreted it to be an alien species.

### Comments

The Garry oak – Broom-moss plant association occurs on sites with convex surface shape, which partly distinguishes it, compared with other bedrock communities. Some occurrences are thought to derive from the Garry oak – Broom-moss – Broad-leaved stonecrop Qgbm-c45 community type as a result of disturbance.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderately low |
| Aesthetic appeal | High |
| Susceptibility to disturbance | Very high |
| Prescribed fire potential | Low |
| Threats | High |
| Restoration potential | High |
| Restoration priority | Moderate |

### Relative Importance Value of Major Species



## Qgbm-c11 Garry oak – Broom-moss – Small-leaved montia

*Quercus garryana – Dicranum scoparium – Montia parvifolia*—community type

### General Description

This community type occurs infrequently in all areas except the northern Gulf Islands. It occurs on cool aspects, very shallowly underlain by uniform bedrock. These are moderate to steep northwest-to-east slopes at low to medium elevations. Moisture regime is xeric to very xeric. These sites can be exposed to insolation but not usually wind. All plots have high exposure of coarse (conglomerate, granitic gneiss) bedrock and surface rocks.

Soils are usually Orthic Regosols with surface Rhizomull humus over very shallow silty loam Ah horizons. Oaks are composed of a tall shrub canopy with small diameters. Seedlings, which are lightly stocked, are regenerating on most sites. Only some sites have saplings but these sites are moderately well stocked. Small-leaved montia (*Montia parvifolia*), broom-moss (*Dicranum scoparium*), blue wildrye (*Elymus glaucus*), cleavers (*Galium aparine*), sweet vernalgrass* (*Anthoxanthum odoratum*), miner's-lettuce (*Montia perfoliata*), and electrified cat's-tail moss (*Rhytidiadelphus triquetrus*) are important on most or all sites. Common snowberry (*Symphoricarpos albus*), silver hairgrass (*Aira caryophyllea*), northern holly fern (*Polystichum* cf. *lonchitis*), and California brome (*Bromus carinatus*) are of lesser importance.

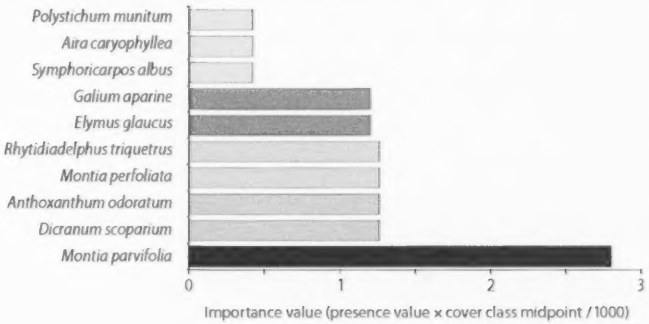
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

This community type also shows similarities to the wet shrubby Garry oak – Oceanspray – Common snowberry – Licorice fern plant community Qgos-c15. Within the bedrock grouping, this subcommunity is distinguished by its residence on north-facing slopes, and by the silt loam texture of the shallow Ah horizon. Disturbance may lead to conversion into the Garry oak – Miner's-lettuce community type, Qggc-c48.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderately low |
| Aesthetic appeal | High |
| Susceptibility to disturbance | Very high |
| Prescribed fire potential | Low |
| Threats | High |
| Restoration potential | Moderately high |
| Restoration priority | Moderately high |

### Relative Importance Value of Major Species



## Qgbm-c51 Garry oak – Broom-moss – Sea blush

*Quercus garryana – Dicranum scoparium – Plectritis congesta*—phenological community type

### General Description

This community type occurs infrequently in the main Vancouver Island range of Garry oak ecosystems. Sites are on cool, convex, and rapidly shedding but protected aspects, shallowly underlain by uniform bedrock. These are steep north and east slopes at low to mid-elevations (< 100 m). Moisture regime is xeric to very xeric but includes permesic on rubble with seepage. All plots have high bedrock exposure, surface and soil coarse fragments, and gravelly shallow soils (Orthic Humic Regosols) with Vermimull surfaces. There is still a relatively deep, fine-textured (loam to silt loam) Ah horizon (> 10–30 cm). Orthic Sombric Brunisols develop in deeper pockets. Oaks of various diameters grow in tree canopy form in these pockets. Most sites are moderately well stocked with saplings. All sites have seedling regeneration but stocking is light on average. Broom-moss (*Dicranum scoparium*), sea blush (*Plectritis congesta*), great camas (*Camassia leichtlinii*), miner's-lettuce (*Montia perfoliata* = *Claytonia* new name), electrified cat's-tail moss (*Rhytidiadelphus triquetris*), and cleavers (*Galium aparine*) are important on all sites. Scotch broom* (*Cytisus scoparius*), sweet vernalgrass* (*Anthoxanthum odoratum*), Pacific snakeroot (*Sanicula crassicaulis*), and broad-leaved stonecrop (*Sedum spathulifolium*) are of lesser importance on all sites. Common snowberry (*Symphoricarpos albus*), trailing blackberry (*Rubus ursinus*), and sweet cicely (*Osmorhiza chilensis*) are present on all sites. With intermediate cover on most sites are oceanspray (*Holodiscus discolor*), California brome (*Bromus carinatus*), Alaska oniongrass (*Melica subulata*), Kentucky bluegrass* (*Poa pratensis*), orchardgrass* (*Dactylis glomerata*), barren fescue* (*Vulpia bromoides*), and small-leaved montia (*Montia parvifolia*), plus the following with minor cover: blue wildrye (*Elymus glaucus*), soft brome* (*Bromus hordeaceus*), barren brome* (*Bromus sterilis*), small-flowered alumroot (*Heuchera micrantha*), field chickweed (*Cerastium arvense*), northern holly fern (*Polystichum* cf. *lonchitis*), Menzies' larkspur (*Delphinium menziesii*), white fawn lily (*Erythronium oregonum*), American vetch (*Vicia americana*), small-flowered blue-eyed Mary (*Collinsia parviflora*), dovefoot geranium* (*Geranium molle*), tiny vetch* (*Vicia hirsuta*), common vetch* (*Vicia sativa*), and common chickweed* (*Stellaria media*).

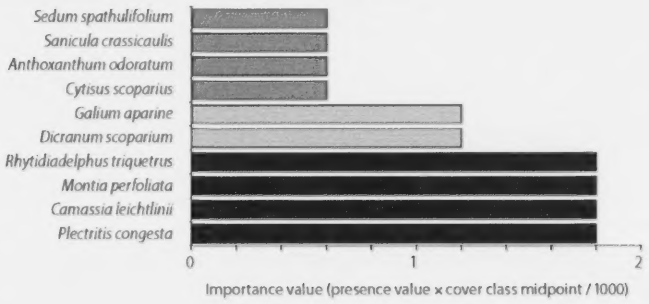
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

This community type was previously included both in the early season and bedrock outcrop community groups. It can be distinguished by this early season occurrence on north-facing slopes, shallowness to bedrock, and association with fine-textured soils—loam to silt loam—with relatively deep Ah horizons. There may be a degree of resiliency in these settings, as suggested by the lack of successional role for this subcommunity (Erickson 1996, 1998).

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderately high |
| Aesthetic appeal | Very high |
| Susceptibility to disturbance | Very high |
| Prescribed fire potential | Low |
| Threats | High |
| Restoration potential | Moderately high |
| Restoration priority | Moderately high |

### Relative Importance Value of Major Species

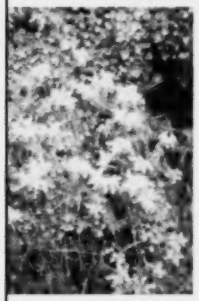


## Qgbm-c45 Garry oak – Broom-moss – Broad-leaved stonecrop

*Quercus garryana – Dicranum scoparium – Sedum spathulifolium*— community type

### General Description

This community type occurs infrequently throughout the area, except for the northern Gulf Islands. It occupies low-elevation sites with high coarse fragments in soil, which is very shallowly underlain by uniform bedrock. The community is often restricted to the southern part of Vancouver Island, and is generally absent from areas accessible to deer grazing. These are moderate to steep, convex, southeast to southwest slopes. Moisture regime is assigned as xeric to very xeric. Though the broom-moss grouping has been conceptualized as cool aspect communities, these sites are exposed to near-maximum insolation and wind. All plots have high exposure of coarse (conglomerate, granitic gneiss) bedrock and surface rocks. Soils are usually Orthic Regosols with surface Rhizomull humus over gravelly shallow loam-textured Ah horizons and high percent coarse fragments. Small-diameter oaks form a tall shrub canopy layer. Well-stocked saplings occur on all sites. Most sites have lightly to moderately well-stocked seedlings.



Broad-leaved stonecrop (*Sedum spathulifolium*) and common snowberry (*Symphoricarpos albus*) are important on all sites. On most sites broom-moss (*Dicranum scoparium*) is important and cleavers (*Galium aparine*) are less important.

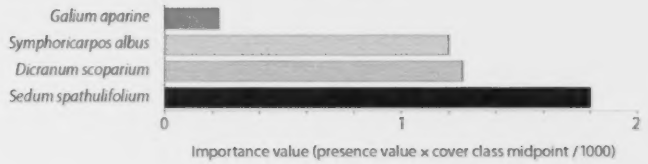
| *Moisture regime* | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| *very xeric* | | | | | |
| | | | | | |
| *subxeric* | | | | | |
| | | | | | |
| *mesic* | | | | | |
| | | | | | |
| *subhygric* | | | | | |

### Comments

This community type is partly distinguished by its high coarse fragments, and by its occurrence on south-facing slopes, as well as features shared with the other bedrock outcrop communities. Disturbance may lead to conversion into the Garry oak – Miner's-lettuce Qggc-c48 community type or, in at least one case on Saltspring Island, to the Garry oak – Scotch broom* – Kentucky bluegrass* (c4 in Erickson 1996, 1998). However, Scotch broom* is not expected to persist on these severe sites.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderately high |
| Aesthetic appeal | Very high |
| Susceptibility to disturbance | Very high |
| Prescribed fire potential | Low |
| Threats | High |
| Restoration potential | Moderately high |
| Restoration priority | Moderately high |

### Relative Importance Value of Major Species



## Qghh Garry oak – Hairy honeysuckle

*Quercus garryana – Lonicera hispidula*—plant association

### Key Features

- Dry, colluvial sites, often at the margins of bedrock landscapes
- Primarily underlain by fractured rock (talus); if bedrock, then cracked and fissured, not uniform
- Frequent, with fairly uniform Garry oak canopy
- Dominated by sparse, deep-rooted native shrubs
- Hairy honeysuckle ≥ 11% cover ≥ other species (except as below)

| | | |
|---|---|---|
| Plant community types | Garry oak – Tall Oregon-grape Qghh-c26 | |
| Plant subcommunities | None | |
| Phenological stages | c21 and c2 are late season communities | |
| Native successional stages | None | |
| Invasive alien community types | Garry oak – Barren brome (c23)<br>Garry oak – Scotch broom* – Hedgehog dogtail* (c2) | Garry oak – Hedgehog dogtail* (c21) |

This plant association is based on the c16a community in Erickson (1996, 1998), and represents a type of site with deep-rooted shrubs in a colluvial landscape. It can also occur on rocky mid-slopes in a grassy matrix.

The plant association and the community types above are distinct based on index of similarity results (IS > 0.2). The two invasive alien community types, c2 and c21, are late season in their phenology.

Flow charts to the plant communities of bedrock landscapes are found under Qgrm. Full keys are found in Appendices 1 and 2.

*Stand, Nanoose Hill.*

*Hairy honeysuckle understorey.*

*Oregon-grape.*

## Qghh Garry oak – Hairy honeysuckle

*Quercus garryana – Lonicera hispidula*—plant association

### General Description

This plant association is locally frequent throughout the range. These are dry, colluvial sites, underlain by fractured rock (talus) or cracked and fissured (not uniform) bedrock. It is often found at the margins of bedrock or other rocky xeric landscapes. Soils have a high percent coarse fragments and coarse texture (loamy sand to sandy loam). This community type is usually found on steep, low-elevation, south- to southwest-facing sites with moderately high cover of surface rock or exposed (chiefly sandstone) bedrock. These sites are exposed to wind and insolation, and range from submesic to xeric. Soils are gravelly and classified as Orthic Sombric Brunisols or Orthic Humic Regosols (where shallow) and have Vermimull or Rhizomull humus, and dark, and sometimes brownish, Ah horizons. Oaks of various diameters occur as a tree or tall shrub canopy, often with high cover. Well-stocked saplings are regenerating on most sites; seedlings vary from lightly to moderately well stocked. Hairy honeysuckle (*Lonicera hispidula*) is important in this sparse vegetation on all sites, along with cleavers (*Galium aparine*) and common vetch* (*Vicia sativa*) on most sites. Blue wildrye (*Elymus glaucus*), Pacific snakeroot (*Sanicula crassicaulis*), and tiny vetch* (*Vicia hirsuta*) are of lesser importance.

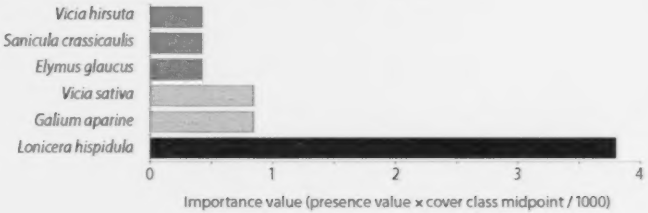
| *Moisture regime* | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| *very xeric* | | | | | |
| | | | | | |
| *subxeric* | | | | | |
| | | | | | |
| *mesic* | | | | | |
| | | | | | |
| *subhygric* | | | | | |

### Comments

This plant association is related to rocky colluvial, talus sites. This talus is often stabilized and is found below the surface. The Garry oak – Hairy honeysuckle plant association often occurs near the sea-edge; it is partly distinguished by its high surface coarse fragments, coarse soils, and occurrence at low elevations. With disturbance it is thought to potentially retrogress into Garry oak – Barren brome (c23).

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderately high |
| Aesthetic appeal | High |
| Susceptibility to disturbance | High |
| Prescribed fire potential | Low |
| Threats | High |
| Restoration potential | High |
| Restoration priority | Moderately high |

### Relative Importance Value of Major Species



## Qghh-c26 Garry oak – Tall Oregon-grape

*Quercus garryana – Mahonia aquifolium*—community type

### General Description

This community type occurs infrequently in all areas except the southern Gulf Islands. These dry, colluvial sites are underlain by fractured rock (talus) or cracked and fissured (not uniform) bedrock. It is often found at the margins of exposed bedrock or other rocky xeric landscapes. Sites have high surface coarse fragments, mineral soil exposure, and low cover values of downed wood. They are usually found on steep, northwesterly aspects at high elevation. These sites are exposed to wind and insolation, and are classified as subxeric to xeric. Soils are classified as Orthic Sombric Brunisols with Vermimull or Xeromull humus. Ah horizons are dark but brownish, and there are high subsurface coarse fragments. Oaks form a tree canopy but have small diameters. Regeneration is occurring on all sites for both saplings (moderately well stocked) and seedlings (light to moderate). Tall Oregon-grape (*Mahonia aquifolium)* is important on all sites. Blue wildrye (*Elymus glaucus*), California brome (*Bromus carinatus*), common vetch* (*Vicia sativa*), and barren brome* (*Bromus sterilis*) are of lesser importance on all sites; with hedgehog dogtail* (*Cynosurus echinatus*) on most sites. Yarrow (*Achillea millefolium*), field chickweed (*Cerastium arvense*), Pacific snakeroot (*Sanicula crassicaulis*), and cleavers (*Galium aparine*) are present on most sites.

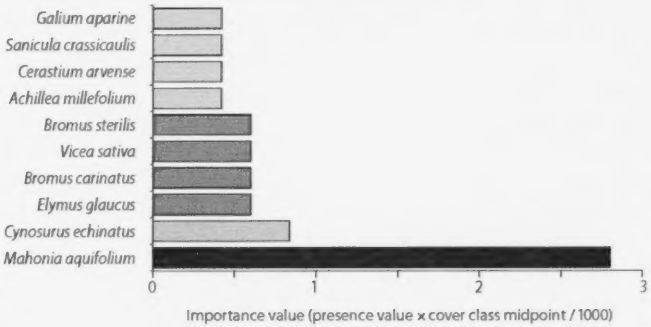
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

This community type occurs on very rocky, colluvial talus sites on more northwesterly slopes with very high surface coarse fragments, which partly distinguishes it. This community may degrade into the invasive alien late season Garry oak – Hedgehog dogtail* (c21) or Garry oak – Barren brome* (c23) community types with disturbance.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | High |
| Aesthetic appeal | High |
| Susceptibility to disturbance | High |
| Prescribed fire potential | Low |
| Threats | Moderately high |
| Restoration potential | High |
| Restoration priority | High |

### Relative Importance Value of Major Species



## Qgrf Garry oak – Roemer's fescue

*Quercus garryana – Festuca roemeri*[9]—plant association

### Key Features

- Gentle to steep slopes with soil mantle
- Often exposed subxeric sites on moderate to steep mid- and upper slopes with bedrock exposure
- Dominated by native herbaceous vegetation; Roemer's fescue ≥ 11% cover

| Plant community types | None | None |
|---|---|---|
| Plant sub-communities | Garry oak – Roemer's fescue – Field chickweed Qgrf-c25<br>Krummholz Garry oak – Roemer's fescue – American vetch Qgrf-c42 | Garry oak – Roemer's fescue – Small-headed clover Qgrf-c27 |
| Phenological stages | c2 and c21 are late season | |
| Native successional stages | None | |
| Invasive alien community types[10] | Garry oak – Hedgehog dogtail* (c21) | Garry oak – Scotch broom* – Hedgehog dogtail* (c2) |

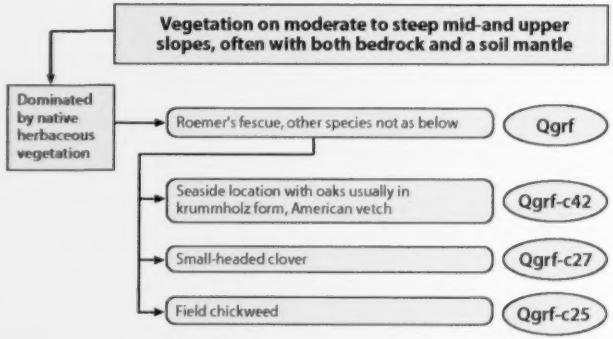
This plant association, based on the *Quercus garryana – Festuca idahoensis* typic subcommunity (c20) in Erickson (1996, 1998) has no community types but has three subcommunities.

Full keys are found in Appendices 1 and 2. Flow charts to bedrock landscapes with soil mantle plant communities follow:

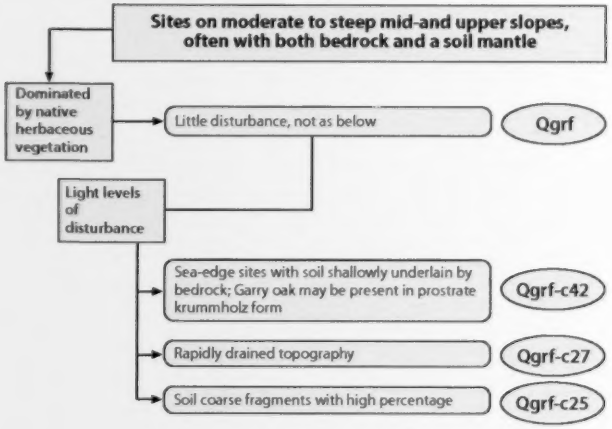
*Roemer's Fescue, above Eagle Ridge stand. On the right, Elkington.*

9 *Festuca idahoensis* is equivalent and is covered here under *F. roemeri*.

10 Invasive alien community types are named but not described here. See Erickson (1996, 1998).


Vegetation on moderate to steep mid-and upper slopes, often with both bedrock and a soil mantle
Dominated by native herbaceous vegetation
Roemer's fescue, other species not as below
Qgrf
Seaside location with oaks usually in krummholz form, American vetch
Qgrf-c42
Small-headed clover
Qgrf-c27
Field chickweed
Qgrf-c25

Notes: Defining species have at least 11% cover. Other details are in the text and the full keys at the back.

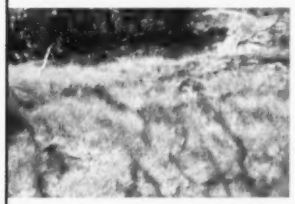

Sites on moderate to steep mid-and upper slopes, often with both bedrock and a soil mantle
Dominated by native herbaceous vegetation
Little disturbance, not as below
Qgrf
Light levels of disturbance
Sea-edge sites with soil shallowly underlain by bedrock; Garry oak may be present in prostrate krummholz form
Qgrf-c42
Rapidly drained topography
Qgrf-c27
Soil coarse fragments with high percentage
Qgrf-c25

## Qgrf Garry oak – Roemer's fescue

*Quercus garryana – Festuca roemeri*[11]—plant association

### General Description

This plant association is locally frequent throughout the range on sites with a surface soil mantle within bedrock-influenced landscapes. It is often on lower-elevation, gentle south-sloping occurrences with coarse (loamy sand to sandy loam), gravelly soils with high subsurface coarse fragments. Also encompassed are exposed subxeric, moderate to steep mid- and upper slopes with both bedrock (primarily sandstone) exposure. Sites are exposed to wind and insolation and are classified as submesic to very xeric. Soils are generally Regosols or Orthic Sombric Brunisols with Vermimull or Rhizomull humus. Ah horizons are dark but often shallow.



Small- and medium-diameter oaks are found mostly in a tree canopy of high cover. Well-stocked saplings are regenerating on most sites, where seedlings vary from lightly to moderately stocked. Roemer's fescue (*Festuca roemeri*) and Pacific snakeroot (*Sanicula crassicaulis*) are important on all sites; hairy honeysuckle (*Lonicera hispidula*) and blue wildrye (*Elymus glaucus*) on most sites. California brome (*Bromus carinatus*), Kentucky bluegrass* (*Poa pratensis*), and cleavers (*Galium aparine*) are of lesser importance on most sites and hairy cat's-ear* (*Hypochaeris radicata*) is minor.

| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

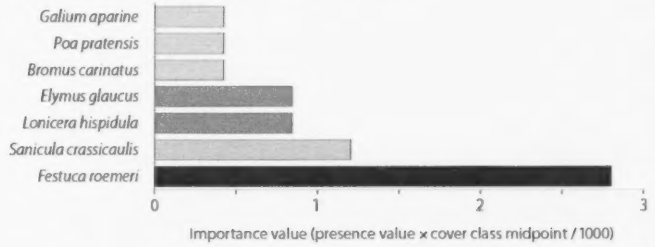
### Comments

This plant association, the least disturbed in the group, has often been overlooked compared with the showy Garry oak meadows. Relatively coarse soils and low-elevation occurrence partly distinguish this plant association. It may degrade into one of the subcommunities (Qgrf-c25, Qgrf-c27), or into an invasive alien community: Garry oak – Hedgehog dogtail* (c21) or Garry oak – Scotch broom* – Hedgehog dogtail* (c2), both of which are late season communities.

Grassy openings away from Garry oak canopy may have similar communities. Roemer's fescue may be found with California oatgrass (*Danthonia californica*), or the latter may co-dominate with harvest brodiaea (*Brodiaea coronaria*). Rarely, xeric sites may include a Lemmon's needlegrass (*Achnatherum lemmonii*) community (Erickson 2003).

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderately high |
| Aesthetic appeal | High |
| Susceptibility to disturbance | High |
| Prescribed fire potential | Moderate |
| Threats | Moderately high |
| Restoration potential | High |
| Restoration priority | Moderately high |

### Relative Importance Value of Major Species




11 *Festuca idahoensis* is equivalent and is covered here under *F. roemeri*.

## Qgrf-c25 Garry oak – Roemer's fescue – Field chickweed

*Quercus garryana – Festuca roemeri – Cerastium arvense*— subcommunity

### General Description

This subcommunity occurs with moderate frequency at low elevations throughout the range with the exception of the Saanich Peninsula, often on exposed subxeric, moderate to steep mid- and upper slopes

with both bedrock (primarily sandstone) exposure and a soil mantle. Soil coarse fragments are high. There are also gentle south-slope occurrences. These sites have been classified as submesic to subxeric in their moisture regime. Soils can be Orthic Sombric Brunisols or Orthic Humic Regosols with dark Ah horizons and Rhizomull or Vermimull humus. These sites usually have tall shrub oaks with small diameters. Saplings are present on most sites with light to moderate stocking. Seedlings are found on some sites with light stocking. Roemer's fescue (*Festuca roemeri*) and field chickweed (*Cerastium arvense*) are important on all sites; yarrow (*Achillea millefolium*) is less important. California brome (*Bromus carinatus*), blue wildrye (*Elymus glaucus*), and sweet vernalgrass* (*Anthoxanthum odoratum*) are important on most sites. Cleavers (*Galium aparine*) and common vetch* (*Vicia sativa*) are of lesser importance. Sheep sorrel* (*Rumex acetosella*) may be present.

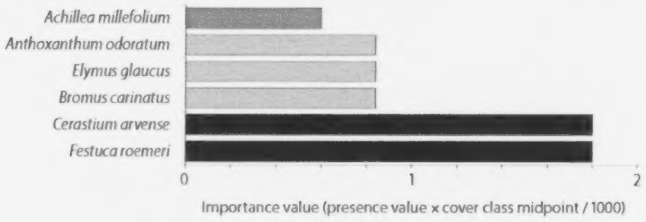
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

This subcommunity is partly distinguished by its primary occurrence at lower elevations. The Garry oak – Roemer's fescue – Field chickweed subcommunity is suggested to be derived from the plant association via slight disturbance, and can degrade into the invasive alien community Garry oak – Hedgehog dogtail* (c21), which is usually associated with the introduction of livestock. The abundance of this invasive alien community suggests that the Garry oak – Roemer's fescue – Field chickweed subcommunity was formerly much more widespread than it is today.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderately low |
| Aesthetic appeal | High |
| Susceptibility to disturbance | High |
| Prescribed fire potential | Moderate |
| Threats | Moderately high |
| Restoration potential | High |
| Restoration priority | Moderately high |

### Relative Importance Value of Major Species



## Qgrf-c27 Garry oak – Roemer's fescue – Small-headed clover

*Quercus garryana – Festuca roemeri – Trifolium microcephalum*—subcommunity

### General Description

This subcommunity is found infrequently only in the southern Gulf Islands, often at high elevations on exposed subxeric, moderate to steep mid- and upper slopes with both bedrock exposure and a surface mantle of coarse (loamy sand to loam) soils.

These subxeric, southwest-facing slopes are exposed to wind and insolation. All plots have moderately high exposure of coarse (sandstone, gneiss) bedrock or surface rocks. They have deep, dark, or slightly brownish Orthic Sombric Brunisols with Rhizomull humus. There are tree canopy oaks with high cover. Some sites have lightly stocked regeneration of both saplings and seedlings. Small-headed clover (*Trifolium microcephalum*) is important on all sites; Roemer's fescue (*Festuca roemeri*), long-stoloned sedge (*Carex inops*), and barren brome* (*Bromus sterilis*) are important on most sites. Field chickweed (*Cerastium arvense*) and Wallace's selaginella (*Selaginella wallacei*) are of lesser importance on all sites; cleavers (*Galium aparine*), hairy cat's-ear* (*Hypochaeris radicata*), and grey rock-moss (*Racomitrium canescens*) on most sites. Blue wildrye (*Elymus glaucus*), silver hairgrass* (*Aira caryophyllea*), California brome (*Bromus carinatus*), sheep sorrel* (*Rumex acetosella*), and few-flowered clover (*Trifolium oliganthum*) may also be present.

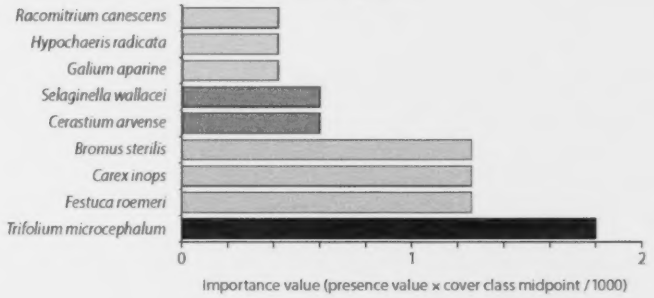
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

This subcommunity may have Junegrass (*Koeleria macrantha*) and/or California oatgrass (*Danthonia californica*) replacing fescue in certain areas. Relatively coarse soils, geographic separation, and occurrence at higher elevations partly distinguish this subcommunity. It is related to the Garry oak – Grey rock-moss – Wallace's selaginella plant association, Qgrm. This subcommunity may be derived from the plant association, Qgrf, via slight disturbance; it degrades into the Garry oak – Hedgehog dogtail* (c21) with continued disturbance associated with the introduction of livestock. The abundance of this invasive alien community suggests that the Garry oak – Roemer's fescue – Small-headed clover subcommunity was formerly much more widespread than today.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Very low |
| Aesthetic appeal | High |
| Susceptibility to disturbance | High |
| Prescribed fire potential | Very high |
| Threats | Moderately high |
| Restoration potential | High |
| Restoration priority | High |

### Relative Importance Value of Major Species



## Qgrf-c42 Krummholz Garry oak – Roemer's fescue – American vetch

*Quercus garryana – Festuca roemeri – Vicia americana*— subcommunity

### General Description

This seaside subcommunity is moderately frequent within all parts of the range except the Saanich Peninsula. It is found on gentle to moderate, often west-facing, convex slopes, which are shallowly underlain by bedrock. These sites are in the seaspray zone, and are exposed to wind and insolation. They have moderately high exposure of coarse (sandstone, granitic) bedrock or surface rocks and are classified as subxeric to xeric. Soils are usually Regosols with an Ah horizon, silt loam texture, and moderately high coarse fragments. Oaks have krummholz form, being wind-trained and low, then grade into tall shrubs or low trees with distance away from the sea. They have small diameters. All sites are well stocked with saplings. Most sites have moderately well-stocked seedlings. American vetch (*Vicia americana*) is important on all sites, with Roemer's fescue (*Festuca roemeri*) and common snowberry (*Symphoricarpos albus*) important on most sites. Cleavers (*Galium aparine*) and common vetch* (*Vicia sativa*) are of lesser importance on all sites; California brome (*Bromus carinatus*), Kentucky bluegrass* (*Poa pratensis*), Pacific snakeroot (*Sanicula crassicaulis*), and great camas (*Camassia leichtlinii*) on most sites. Field chickweed (*Cerastium arvense*) is present on all sites.

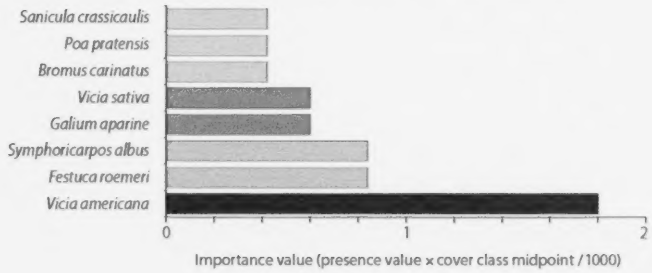
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

The term krummholz is used to describe this stunted form in the oaks of this subcommunity. They grow to a height of about 20 cm where most exposed to the wind on the sea-edge. The oaks then grade upwards in a continuous mat, reaching about 2 m in height with distance away from the exposure to wind and saltspray. American vetch in this community sometimes has lower cover. A related Garry oak – American vetch parkland type was recognized from Galiano Island, but was dropped, being represented by only two plots. The type is thought to reflect reduced deer grazing pressure on the island. Reconnaissance notes also suggest that this parkland type is present at Yellow Point, Boathouse Harbour north, Deer Point, Flewitt Point, Water Tower Hill, and Summit Park on Vancouver Island. The krummholz sea-edge form of oak also occurs without American vetch. A couple of these occurrences fall within the Garry oak – California brome plant community Qgcc-c43 and are attributed to light levels of disturbance. Increased levels may result in retrogression into the Garry oak – hedgehog dogtail* (c21).

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Very high |
| Aesthetic appeal | High |
| Susceptibility to disturbance | Very high |
| Prescribed fire potential | Avoid |
| Threats | High |
| Restoration potential | High |
| Restoration priority | High |

### Relative Importance Value of Major Species



## Qgcc Garry oak – Common camas – Blue wildrye

*Quercus garryana – Camassia quamash – Elymus glaucus*— plant association

### Key Features

- Gentle to steep slopes
- Soil mantle dominated by native herbaceous vegetation
- Often submesic gentle to moderate mid-slopes
- Light to moderate shrub understorey, common camas (April 1 to May 15) and/ or blue wildrye (May 15 onwards) ≥ 11% cover ≥ other herb species
- Dominated in early season by herbaceous forb species or later by herbaceous grasses

The concept of the Garry oak – Common camas – Blue wildrye plant association is founded on the Garry oak – Common camas phenological plant community type and the Garry oak – Blue wildrye plant community type (Qgcc-c37a and Qgcc-c47, respectively) (Erickson 1996, 1998). This plant association overlaps (including invasive alien communities supported) with the Garry oak – Great camas – Blue wildrye plant association, but is separated to recognize the differences in dominant camas, moisture conditions, seasonality, and geographic occurrence.

This plant association consists of three plant community types, plus one native successional plant community type. Another community, the Garry oak – Miner's-lettuce Qggc-c48, is described under the next plant association. There is a further subdivision into three phenological subcommunities and five invasive alien communities. The latter are named but not described here.

| Plant community types | Garry oak – Blue wildrye Qgcc-c47 | Garry oak – Long-stoloned sedge Qgcc-c14 |
|---|---|---|
| Phenological plant community types | Garry oak – Common camas Qgcc-c37a | |
| Native successional community types | Garry oak – California brome Qgcc-c43 | |
| Phenological plant subcommunities | Garry oak – Common camas – White fawn lily Qgcc-c35a<br>Garry oak – Common camas – Western buttercup Qgcc-c37b | Garry oak – Common camas – Broad-leaved shootingstar Qgcc-c35b |
| Native successional subcommunities | Qgcc-c37a | Qgcc-c37b |
| Invasive alien community types (Erickson 1996, 1998) | Garry oak – Sweet vernalgrass* (c31a)<br>Garry oak – Scotch broom* – Sweet vernalgrass* (c31b) | Garry oak – Scotch broom* – Kentucky bluegrass* (c4) |
| Invasive alien subcommunities (Erickson 1996, 1998) | Garry oak – Barren brome* (c23) | Garry oak – Kentucky bluegrass* – Common vetch* (c29a) |

### Notes

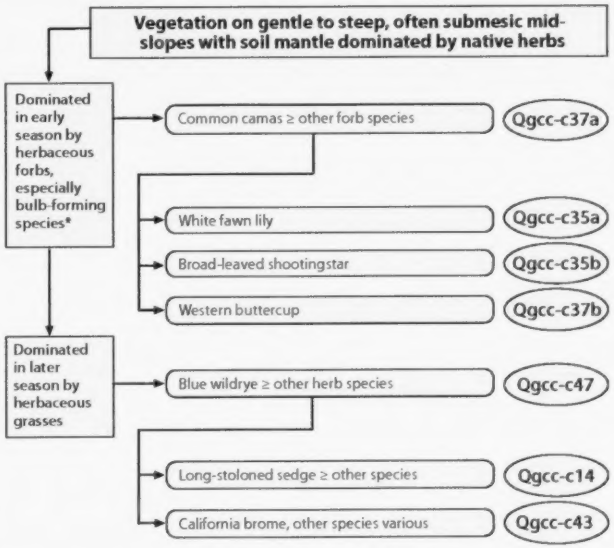
The early season communities here provide the flower shows for which the Garry oak habitat is famous in spring. The common camas communities develop fairly early in the spring (in April), about three weeks earlier than the great camas meadows. They then decline past flowering by mid-May or so. Common camas can be detected vegetatively into June. Very similar early season communities occur in openings without Garry oak (W. Erickson, 2003, unpublished data).

Scotch broom* and orchardgrass* generally can invade these communities when they occur on less severe sites.

For a detailed description of the Garry oak – common camas – blue wildrye plant association:

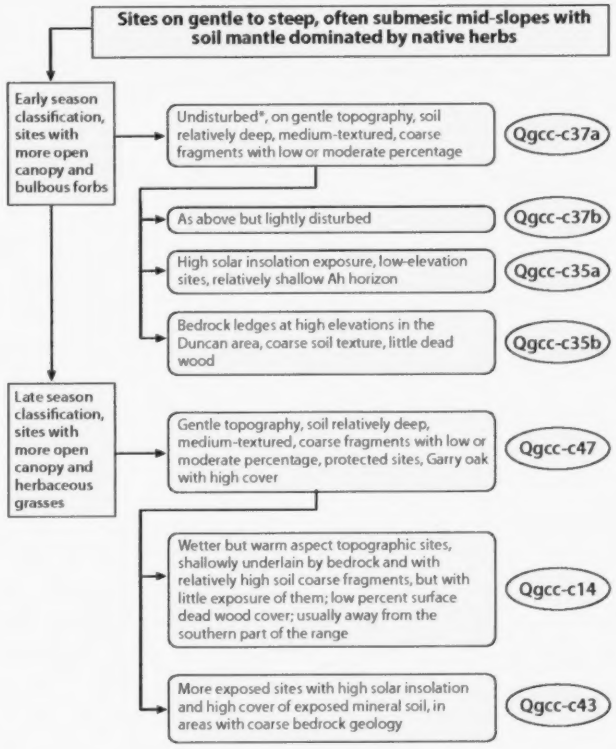
- **in early season,** see the Garry oak – Common camas community type, or
- **in late season,** see the Garry oak – Blue wildrye community type.

Full keys are found in Appendices 1 and 2. Flow charts to the plant communites follow (gentle to steep, often submesic mid-slopes with soil mantle dominated by native herbs).


Vegetation on gentle to steep, often submesic mid-slopes with soil mantle dominated by native herbs
Dominated in early season by herbaceous forbs, especially bulb-forming species*
Common camas ≥ other forb species
Qgcc-c37a
White fawn lily
Qgcc-c35a
Broad-leaved shootingstar
Qgcc-c35b
Western buttercup
Qgcc-c37b
Dominated in later season by herbaceous grasses
Blue wildrye ≥ other herb species
Qgcc-c47
Long-stoloned sedge ≥ other species
Qgcc-c14
California brome, other species various
Qgcc-c43

* Defining species have at least 11% cover. Early season is April 15 to May 15. Other details are in the text and the full keys at the back.

*Landscape, Mount Tzhouhalem.*


Sites on gentle to steep, often submesic mid-slopes with soil mantle dominated by native herbs
Early season classification, sites with more open canopy and bulbous forbs
Undisturbed*, on gentle topography, soil relatively deep, medium-textured, coarse fragments with low or moderate percentage
Qgcc-c37a
As above but lightly disturbed
Qgcc-c37b
High solar insolation exposure, low-elevation sites, relatively shallow Ah horizon
Qgcc-c35a
Bedrock ledges at high elevations in the Duncan area, coarse soil texture, little dead wood
Qgcc-c35b
Late season classification, sites with more open canopy and herbaceous grasses
Gentle topography, soil relatively deep, medium-textured, coarse fragments with low or moderate percentage, protected sites, Garry oak with high cover
Qgcc-c47
Wetter but warm aspect topographic sites, shallowly underlain by bedrock and with relatively high soil coarse fragments, but with little exposure of them; low percent surface dead wood cover; usually away from the southern part of the range
Qgcc-c14
More exposed sites with high solar insolation and high cover of exposed mineral soil, in areas with coarse bedrock geology
Qgcc-c43

* Qgcc may have high natural mineral soil exposure though.

## Qgcc Garry oak – Common camas – Blue wildrye

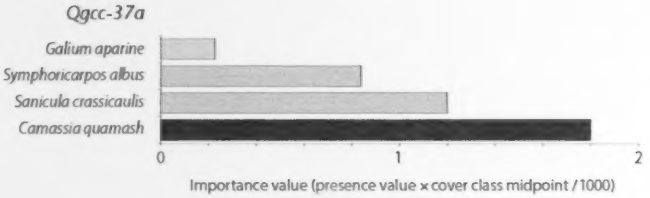
*Quercus garryana – Camassia quamash – Elymus glaucus*— plant association

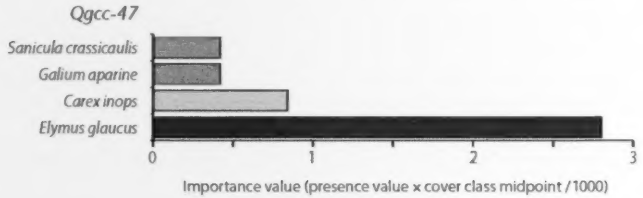
### General Description

Detailed descriptions for this plant association can be found with the two community types (Qgcc-c37a, Qgcc-c47) on which it is based. They differ in phenological stage, with the former developing in spring but giving way to the latter in late spring and summer. They differ also in that each is absent from one of the five geographic areas. Environment and soils vary, but community is best developed on gentle, relatively moist (mesic), south-facing slopes with deep fine-textured soils. Soils are generally Orthic Sombric Brunisols with deep, dark Ah horizons and Vermimull or Rhizomull humus forms, and silt loam mineral soils. Sites usually have a tree canopy layer. In spring, common camas (*Camassia quamash*) is important on all sites; in summer, blue wildrye (*Elymus glaucus*) is important, along with long-stoloned sedge (*Carex inops*). Pacific snakeroot (*Sanicula crassicaulis*), cleavers (*Galium aparine*), and sometimes common snowberry (*Symphoricarpos albus*) are constant through these seasons, but of lesser importance.

*Blue wildrye, Lone Tree Hill.*

### Relative Importance Value of Major Species



*Elkington, shooting stars.*

## Qgcc-c37a Garry oak – Common camas

*Quercus garryana – Camassia quamash*—community type

### General Description

This community type is moderately frequent within the Garry oak habitat.

Environment and soils vary, but the community is best developed on gentle, relatively moist (mesic) south-facing slopes with deep fine-textured soils. Soils are generally Orthic Sombric Brunisols with deep (10–35 cm) dark (10YR2/1.5) Ah horizons, Vermimull or Rhizomull humus forms, and gravelly silt loams. Sites may also be concave or have moisture inflow, with a high percent mineral soil exposure of soils that are medium textured with low or moderate percent coarse fragments. Sites usually have a tree canopy layer of oaks of various diameters. Regeneration is present on most sites for saplings (moderately well stocked) and on some sites for seedlings, which are lightly stocked.

Common camas (*Camassia quamash*) is important on all sites; Pacific snakeroot (*Sanicula crassicaulis*) is of lesser importance. Common snowberry (*Symphoricarpos albus*) is important on most sites; cleavers (*Galium aparine*) are of lesser importance.

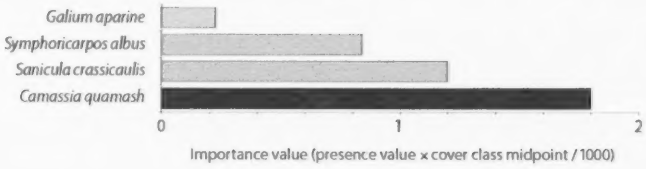
| *Moisture regime* | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| *very xeric* | | | | | |
| | | | | | |
| *subxeric* | | | | | |
| | | | | | |
| *mesic* | | | | | |
| | | | | | |
| *subhygric* | | | | | |

### Comments

This community type is distinguished by occurrence on concave and other sites with moisture inflow and by deep Ah horizons from fine-textured (silt loam) soils. Common camas communities are best developed in the Duncan area and are absent from the southern Gulf Islands. Very similar communities are infrequent on openings without Garry oak (W. Erickson, 2002, unpublished data). This community type may be partly derived from related subcommunities through the depletion of bulbs by grazing. Further disturbance could lead to the development of the Garry oak – Miner's-lettuce community type Qggc-c48, which is described under the next plant association.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderately low |
| Aesthetic appeal | Very high |
| Susceptibility to disturbance | Very high |
| Prescribed fire potential | High |
| Threats | High to very high |
| Restoration potential | Very high |
| Restoration priority | Very high |

### Relative Importance Value of Major Species



## Qgcc-c35a Garry oak – Common camas – White fawn lily

*Quercus garryana – Camassia quamash – Erythronium oregonum*—subcommunity

### General Description

This subcommunity occurs infrequently within the Garry oak habitat on low-elevation sites with high solar insolation exposure and relatively shallow Ah horizons. Environment and soils vary, but this subcommunity develops best on gentle, mesic south-facing slopes. Generally, these are Orthic Sombric Brunisols and Regosols with dark (10YR2/1) Ah horizons and Vermimull humus forms, over sandy loam to silt loam soils. Sites have small-diameter tall shrub or tree canopy oaks. Regeneration is occurring on most sites. Saplings are moderately well to well stocked, but seedlings are mowed on some sites and average only lightly stocked. Common camas (*Camassia quamash*), white fawn lily (*Erythronium oregonum*), and common snowberry (*Symphoricarpos albus*) are important on all sites. Orchardgrass* (*Dactylis glomerata*) and tall Oregon-grape (*Mahonia aquifolium*) are important on most sites.

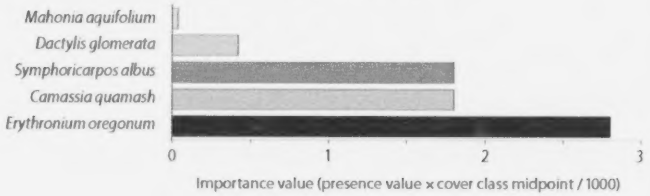
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

This subcommunity is partly distinguished by its mesic ecological moisture regime, and by dark Ah soil horizons. The Garry oak – Common camas – White fawn lily subcommunity Qgcc-c35a is absent from the southern Gulf Islands and western shore. Some disturbance could derive the Garry oak – Common camas – Broad-leaved shootingstar subcommunity Qgcc-c35b; a greater degree of disturbance could lead to the Garry oak – Miner's-lettuce community Qggc-c48, which is described under the next plant association.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderate |
| Aesthetic appeal | Very high |
| Susceptibility to disturbance | Very high |
| Prescribed fire potential | Very high |
| Threats | High to very high |
| Restoration potential | Very high |
| Restoration priority | Very high |

### Relative Importance Value of Major Species



## Qgcc-c35b Garry oak – Common camas – Broad-leaved shootingstar

*Quercus garryana – Camassia quamash – Dodecatheon hendersonii*—subcommunity

### General Description

This subcommunity occurs infrequently within the Garry oak habitat in the Duncan area. It occurs on bedrock ledges at high elevations (170–275 m), which have coarse soil texture and little dead wood. They are xeric to submesic (moderately high to very high bedrock exposure) and exposed. Generally, soils are Orthic Sombric Brunisols and Regosols, with dark (10YR2/1.5) Ah horizons and Vermimull humus forms. High surface coarse fragments lie over gravelly and very gravelly loam soils, often shallow to bedrock. Sites have small-diameter tall shrub or tree canopy. Regeneration is present on some sites for saplings and on all sites for seedlings. Average stocking level is light for both saplings and seedlings. Common camas (*Camassia quamash*), broad-leaved shootingstar (*Dodecatheon hendersonii*), grey rock-moss (*Racomitrium canescens*), blue wildrye (*Elymus glaucus*), and juniper hair-cap moss (*Polytrichum juniperinum*) are important on all sites. Scotch broom* (*Cytisus scoparius*) is important on most sites. Of lesser importance on all sites are cleavers (*Galium aparine*), yarrow (*Achillea millefolium*), sheep sorrel* (*Rumex acetosella*), and common chickweed* (*Stellaria media*). Of lesser importance on most sites are common snowberry (*Symphoricarpos albus*), long-stoloned sedge (*Carex inops*), and broom-moss (*Dicranum scoparium*). The following species are present on all sites: tall Oregon-grape (*Mahonia aquifolium*), California brome (*Bromus carinatus*), many-flowered woodrush (*Luzula multiflora*), sea blush (*Plectritis congesta*), Pacific snakeroot (*Sanicula crassicaulis*), harvest brodiaea (*Brodiaea coronaria*), spring gold (*Lomatium utriculatum*), small-flowered blue-eyed Mary (*Collinsia parviflora*), and few-flowered clover (*Trifolium oliganthum*).

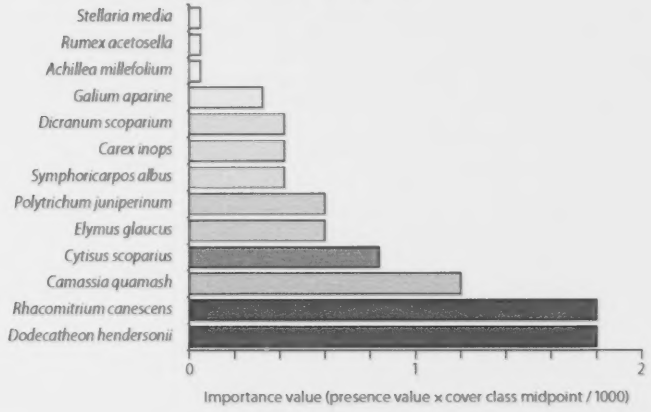
| *Moisture regime* | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| *very xeric* | | | | | |
| | | | | | |
| *subxeric* | | | | | |
| | | | | | |
| *mesic* | | | | | |
| | | | | | |
| *subhygric* | | | | | |

### Comments

This subcommunity is distinguished by its occurrence on bedrock ledges at high elevations in the Duncan area. Some disturbance could lead to the Garry oak – Common camas community type Qgcc-c37a; a greater degree could produce the Garry oak – Miner's-lettuce native succesional community type Qggc-c48, which is described under the next plant association.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Low |
| Aesthetic appeal | Very high |
| Susceptibility to disturbance | Very high |
| Prescribed fire potential | High |
| Threats | High |
| Restoration potential | Very high |
| Restoration priority | Very high |

### Relative Importance Value of Major Species



## Qgcc-c37b Garry oak – Common camas – Western buttercup

*Quercus garryana – Common camas – Ranunculus occidentalis*—subcommunity

### General Description

This subcommunity is moderately frequent in certain areas within the Garry oak habitat. It occurs on gently sloping but exposed southerly aspects. Sites range across a variety of elevations and have submesic to subxeric moisture ratings. Bedrock is often exposed or occurs at moderate depths. Soils are silt loams classified as Orthic Sombric Brunisols with deep, dark (10YR2/1 to 1.5) Ah horizons and Orthi-rhizomull humus forms.

Sites mostly have a tree canopy layer with various diameters. Lightly to moderately well-stocked saplings are regenerating on most sites but no seedlings were observed. Common camas (*Camassia quamash*) and western buttercup (*Ranunculus occidentalis*) are important on all sites. Kentucky bluegrass* (*Poa pratensis*), orchardgrass* (*Dactylis glomerata*), and common vetch* (*Vicia sativa*) are of lesser importance on most or all sites. Common chickweed* (*Stellaria media*) may also be present.

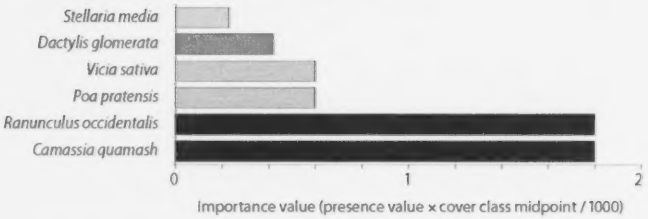
| *Moisture regime* | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| *very xeric* | | | | | |
| | | | | | |
| *subxeric* | | | | | |
| | | | | | |
| *mesic* | | | | | |
| | | | | | |
| *subhygric* | | | | | |

### Comments

This subcommunity is associated with a light level of disturbance and is partly distinguished by fine-textured (silt loam) and deep Ah horizon soil features. The Garry oak – Common camas – Western buttercup subcommunity is a deeper soil type than the two related subcommunities, but could be derived from them through the depletion of bulbs or forbs by grazing and mowing. Disturbance can convert this subcommunity type into the Garry oak – Miner's-lettuce community Qggc-c48, which is described under the next plant association.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Very low |
| Aesthetic appeal | Very high |
| Susceptibility to disturbance | Very high |
| Prescribed fire potential | High |
| Threats | High to very high |
| Restoration potential | Very high |
| Restoration priority | Very high |

### Relative Importance Value of Major Species



## Qgcc-c47 Garry oak – Blue wildrye

*Quercus garryana – Elymus glaucus*—community type

### General Description

This community type occurs frequently within the range, except the northern Gulf Islands. These are cool, protected, or wetter sites including basins and gentle topography. They have relatively deep, medium-textured soils with low or moderate percent coarse fragments. They are mainly mesic to submesic sites at medium to high elevation, often exposed to insolation, wind, steepness, bedrock, or surface rock, but receiving compensating seepage. Soils are usually gravelly Orthic Sombric Brunisols with Rhizomull or Vermimull humus, dark to slightly brownish Ah horizon, loamy (sandy loam to silt loam) texture, and often have a high percent coarse fragments. Garry oaks are found in a high-cover tree canopy of various diameters. Most sites have moderately stocked saplings and light to moderately stocked seedling regeneration. Blue wildrye (*Elymus glaucus*) is important in the sparse and uniform cover of all these sites; long-stoloned sedge (*Carex inops*) is important on most sites. Cleavers (*Galium aparine*) and Pacific snakeroot (*Sanicula crassicaulis*) are of lesser importance on most sites.

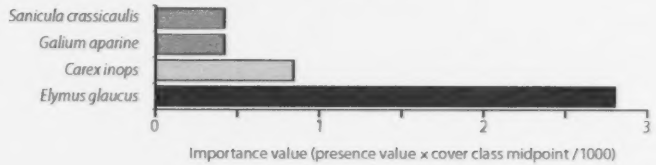
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

This community type is also designated Qggc-c47, as it is a key component of both this plant association and the next. It usually occurs on medium- to high-elevation sites, which partly distinguishes it. The Garry oak – Blue wildrye community type is sometimes found in a shrub type with common snowberry. This community type is suggested to have an important role as the origin of a number of native successional (e.g., Qgcc-c43) and invasive alien communities, including the widespread sweet vernalgrass communities (c31a, c31b in Erickson 1996, 1998).

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderately high |
| Aesthetic appeal | High |
| Susceptibility to disturbance | High |
| Prescribed fire potential | High |
| Threats | Moderately high |
| Restoration potential | Very high |
| Restoration priority | Very high |

### Relative Importance Value of Major Species



## Qgcc-c43 Garry oak – California brome

*Quercus garryana – Bromus carinatus*—native successional community type

### General Description

This community type is moderately frequent throughout the range. These are more exposed sites with high solar insolation, coarse bedrock geology, and high surface mineral soil and coarse fragments. They have a bifold distribution on south to southwest slopes, both on local mountains and at low elevation near the sea. Moisture regime is usually subxeric to submesic, and there is some exposure to seaspray. Sites have Orthic Sombric Brunisols with Vermimull humus and deep, dark Ah horizons. The soils are mainly gravelly sandy loam to loam with high coarse fragment content. Sites mainly have a tall shrub oak canopy of small to medium diameter. Saplings are well stocked on all sites. Seedlings are moderately to well stocked on most sites. California brome (*Bromus carinatus*), common vetch* (*Vicia sativa*), and cleavers (*Galium aparine*) are important on all sites. Great camas (*Camassia leichtlinii*) is of lesser importance. Barren brome* (*Bromus sterilis*) is important on most sites; barren fescue* (*Vulpia bromoides*) is of lesser importance. Blue wildrye (*Elymus glaucus*) is usually present.

| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

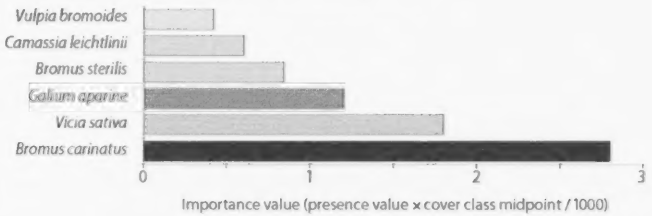
### Comments

This community type is probably not as visually obvious as the others. A number of the plots were very near the sea, and the other two were post-burn on Mount Douglas in Victoria. This community type is partly distinguished by the sea-edge occurrences in wind-exposed sites. High surface or subsurface coarse fragments may be another distinguishing factor. Garry oak – California brome native successional community type is suggested to result from the effects of light understorey disturbance on the Garry oak – Blue wildrye community type Qgcc-c47. Increasing this level of disturbance leads to the development of one of three invasive alien communities.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Very high |
| Aesthetic appeal | High |
| Susceptibility to disturbance | High |
| Prescribed fire potential | High† |
| Threats | Moderately high |
| Restoration potential | Very high |
| Restoration priority | High |

† Avoid fire on sea-edge krummholz occurrences

### Relative Importance Value of Major Species



## Qgcc-c14 Garry oak – Long-stoloned sedge

*Quercus garryana – Carex inops*—community type

### General Description

This community type is moderately frequent, but usually away from the southern part of the range. It occurs across a wide variety of sites, but characteristically on wetter but warm-aspect topographic sites,

which are shallowly underlain by bedrock. They have a low percent of rocks and dead wood at the surface, but high soil coarse fragments. Sites range from xeric to permesic, on gentle to moderately steeply sloping south to east aspects. They have various exposures: wind, insolation, or bedrock. Soils are Orthic Sombric Brunisols or Orthic Humic Regosols with Rhizomull or Vermimull humus, dark Ah horizons, and very gravelly silt loam texture. These are tree-layer oak canopies with high cover, which affects plant composition. Moderate stocking of saplings is present on some sites. Most sites have lightly stocked seedlings. Long-stoloned sedge (*Carex inops*) is important on all sites. Blue wildrye (*Elymus glaucus*), western buttercup (*Ranunculus occidentalis*), cleavers (*Galium aparine*), and tiny vetch* (*Vicia hirsuta*) are of lesser importance on most sites. Common vetch* (*Vicia sativa*) is present on all sites; California oatgrass (*Danthonia californica*) and sheep sorrel* (*Rumex acetosella*) on most sites.

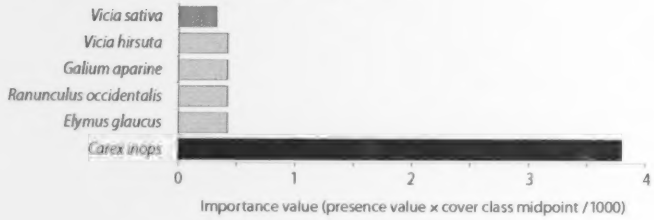
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

This community type is geographically clustered within its otherwise widespread distribution. Occurrence on silt loam soils may be one distinguishing factor. The Garry oak – Long-stoloned sedge community type is thought to occur on different types of sites than related communities, and its composition reflects the influence of more complete, high-cover oak stands. This is an original community from which invasive alien communities (Garry oak – Kentucky bluegrass – Common vetch c29a and Garry oak – Scotch broom* – Kentucky bluegrass* c4) (Erickson 1996, 1998) have been derived under the influence of heavy disturbance.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderately low |
| Aesthetic appeal | High |
| Susceptibility to disturbance | High |
| Prescribed fire potential | High |
| Threats | Moderately high |
| Restoration potential | Very high |
| Restoration priority | High |

### Relative Importance Value of Major Species



## Qggc Garry oak – Great camas – Blue wildrye

*Quercus garryana – Camassia leichtlinii – Elymus glaucus*— plant association

### Key Features

- Mesic to submesic gentle lower slopes
- Light to moderate native shrub understorey, great camas (April 21 to May 15) and/ or blue wildrye (May 15 onwards) ≥ 11% cover ≥ other herb species
- Soils relatively deep, medium-textured, with low or moderate percent coarse fragments
- Light to moderate native shrub understorey
- Dominated in early season by herbaceous forb species or later by herbaceous grasses

The concept of the Garry oak – Great camas – Blue wildrye plant association is founded on the Garry oak – Great camas phenological plant community type Qggc-c36 and the Garry oak – Blue wildrye plant community type Qggc-c47 (Erickson 1996, 1998). This plant association overlaps with the Garry oak – Common camas – Blue wildrye plant association, including the invasive alien communities that are supported. It is separated to recognize the difference in the dominant camas, moisture conditions, seasonality, and geographic occurrence. This plant association consists of three plant community types, including one designated as a phenological plant community type. There are also two native successional plant community types, one of which occurs in the early season, and another encroaches on these communities. There is a further subdivision into five invasive alien community types and two invasive alien subcommunities. These latter communities are named but not described here.

| | | |
|---|---|---|
| Plant community types | Garry oak – Great camas Qggc-c36 (phenological)<br>Garry oak – Alaska oniongrass Qggc-c13 | Garry oak – Blue wildrye Qggc-c47 |
| Native successional community types | Garry oak – Purple peavine Qggc-c41 | Garry oak – Miner's-lettuce Qggc-c48 (phenological) |
| Plant subcommunities | None | |
| Phenological stages | Qggc-c36 | |
| Native successional subcommunities | None | |
| Invasive alien community types (Erickson 1996, 1998) | Garry oak – Scotch broom* – Blue wildrye (c6)<br>Garry oak – Orchardgrass* – Redtop hairgrass* (c49) | Garry oak – Orchardgrass* – Tall oatgrass* (c30) |
| Invasive alien subcommunities (Erickson 1996, 1998) | Garry oak – Orchardgrass* (c28a and c28b) | Garry oak – Scotch broom* – Orchardgrass* (c5) |

### Notes

The early season communities above provide the flower shows for which the Garry oak habitat is famous in spring. The great camas community develops in the spring (in late April), about three weeks after the Garry oak – Common camas community type. The great camas communities generally decline past flowering by late May, but can be detected vegetatively into June. Very similar communities occur in openings without Garry oak (W. Erickson, 2002, unpublished data).

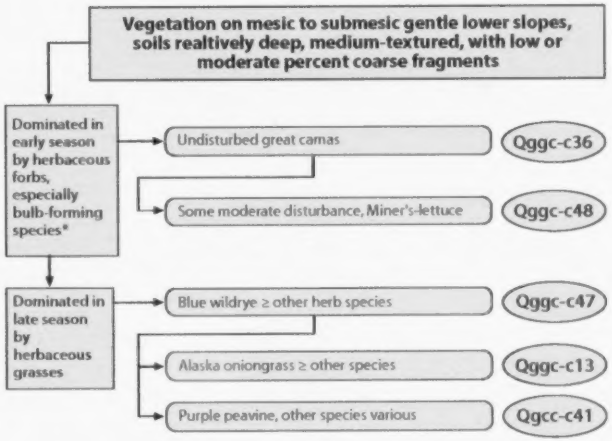
A native successional community type, Garry oak – (Douglas-fir) – Oceanspray – Snowberry – Electrified cat's-tail moss Qgos-c10, encroaches on this mesic community from wetter sites of the Garry oak – Oceanspray – Common snowberry plant association. See Qgos-c10 for a description.

Scotch broom* and orchardgrass* are major invaders on the favourable sites occupied by these communities.

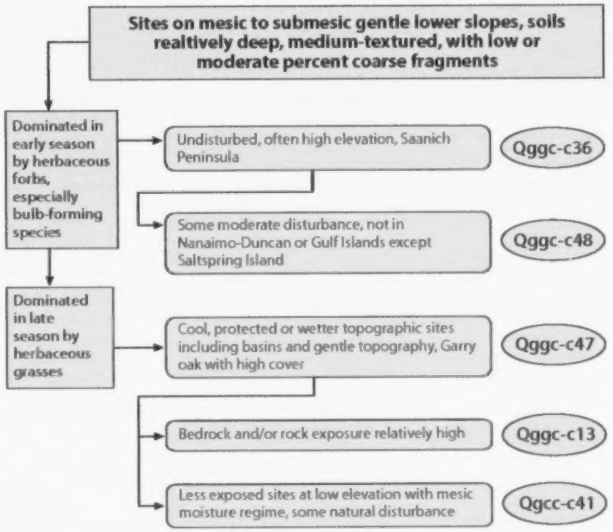
For a **description** of the Garry oak – Great camas – Blue wildrye plant association:

- **in early season,** see the Garry oak – great camas community type, or
- **in late season,** see the Garry oak – blue wildrye community type (found under the previous plant association).

Full keys are found in Appendices 1 and 2. Flow charts to the plant communities follow (mesic to submesic gentle lower slopes, soils relatively deep, medium textured, with low or moderate percent coarse fragments):


Vegetation on mesic to submesic gentle lower slopes, soils realtively deep, medium-textured, with low or moderate percent coarse fragments
Dominated in early season by herbaceous forbs, especially bulb-forming species*
Undisturbed great camas
Qggc-c36
Some moderate disturbance, Miner's-lettuce
Qggc-c48
Dominated in late season by herbaceous grasses
Blue wildrye ≥ other herb species
Qggc-c47
Alaska oniongrass ≥ other species
Qggc-c13
Purple peavine, other species various
Qgcc-c41

* Defining species have at least 11% cover. Early season is April 15 to May 15. Other details are in the text and the full keys at the back.


Sites on mesic to submesic gentle lower slopes, soils realtively deep, medium-textured, with low or moderate percent coarse fragments
Dominated in early season by herbaceous forbs, especially bulb-forming species
Undisturbed, often high elevation, Saanich Peninsula
Qggc-c36
Some moderate disturbance, not in Nanaimo-Duncan or Gulf Islands except Saltspring Island
Qggc-c48
Dominated in late season by herbaceous grasses
Cool, protected or wetter topographic sites including basins and gentle topography, Garry oak with high cover
Qggc-c47
Bedrock and/or rock exposure relatively high
Qggc-c13
Less exposed sites at low elevation with mesic moisture regime, some natural disturbance
Qgcc-c41

*Great camas stand, Elkington.*

## Qggc Garry oak – Great camas – Blue wildrye

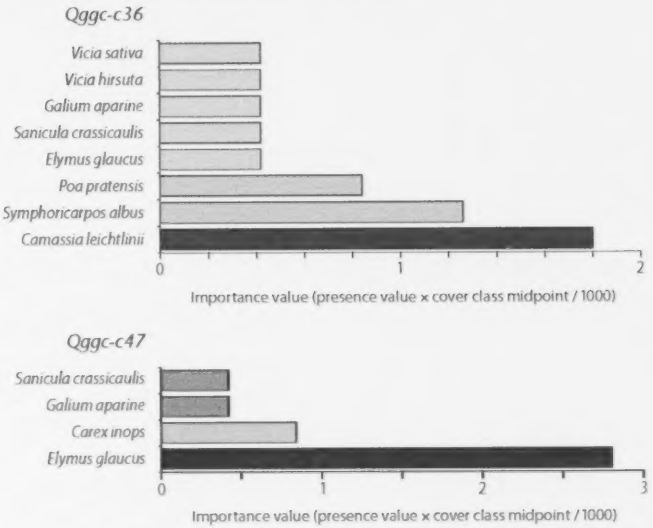
*Quercus garryana – Camassia leichtlinii – Elymus glaucus*— plant association

### General Description

This plant association is described in detail in two community types (Qggc-c36, Qggc-c47) on which it is based. They differ in phenological stage, with the former developing in spring but giving way to the latter in late spring and summer. Both are absent from the northern Gulf Islands. Environment and soils vary, but the community is best developed on gentle, relatively moist (mesic to permesic) lower slopes with deep, fine-textured soils. Soils are generally Orthic Sombric Brunisols with deep, dark Ah horizons and Vermimull or Rhizomull humus forms, and silt loams mineral soils. Sites usually have a tree canopy layer. In spring, great camas (*Camassia leichtlinii*) is important on all sites. In summer, blue wildrye (*Elymus glaucus*) is important, along with long-stoloned sedge (*Carex inops*). Pacific snakeroot (*Sanicula crassicaulis*) and cleavers (*Galium aparine*) are constant through these seasons, but of lesser importance. The same goes for common snowberry (*Symphoricarpos albus*), Kentucky bluegrass* (*Poa pratensis*), tiny vetch* (*Vicia hirsuta*), and common vetch* (*Vicia sativa*), which are present on some sites.

*Great camas and grasses.*

### Relative Importance Value of Major Species



## Qggc-c36 Garry oak–Great camas

*Quercus garryana–Camassia leichtlinii*—community type

### General Description

This community type is common, being very frequent and widespread (with local exceptions) on gentle to steep, mesic to submesic lower slopes. It has a relatively deep and medium-textured (loam to silt loam) soil mantle, with low or moderate percent coarse fragments. It often occurs on high-elevation Saanich Peninsula sites. Environment and soils vary, but are best developed on relatively moist (permesic) slopes with exposed rock. Soils are generally Orthic Sombric Brunisols with deep (10–35 cm) dark (10YR2/1) Ah horizons, Vermimull or Rhizomull humus forms, and gravelly to very gravelly textures. Most sites have a tree canopy of oaks with various diameters, and moderately well-stocked saplings and lightly stocked seedlings. Great camas (*Camassia leichtlinii*) is important on all sites. Species important on most sites include common snowberry (*Symphoricarpos albus*) and Kentucky bluegrass* (*Poa pratensis*); blue wildrye (*Elymus glaucus*), Pacific snakeroot (*Sanicula crassicaulis*), cleavers (*Galium aparine*), tiny vetch* (*Vicia hirsuta*), and common vetch* (*Vicia sativa*) are of lesser importance.

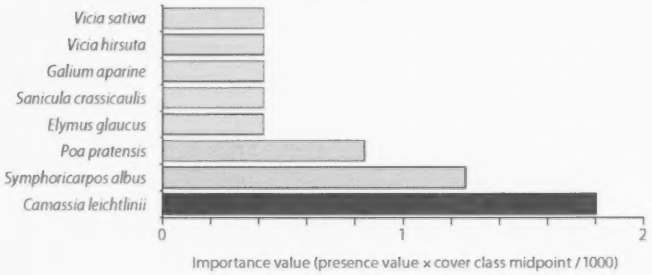
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

This community type is distinguished in part by deep Ah horizons from fine-textured (loam to silt loam) soils and a core distribution on the Saanich Peninsula and western shore. Disturbance and native succession in this community can lead to the development of the Garry oak–Miner's-lettuce community type Qggc-c48.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderate |
| Aesthetic appeal | Very high |
| Susceptibility to disturbance | Very high |
| Prescribed fire potential | High |
| Threats | High to very high |
| Restoration potential | Very high |
| Restoration priority | Very high |

### Relative Importance Value of Major Species

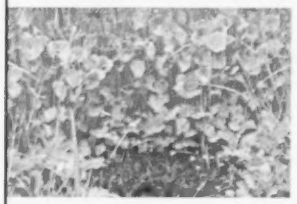


## Qggc-c48 Garry oak – Miner's-lettuce

*Quercus garryana – Montia perfoliata*—native successional community type

### General Description

This community type is derived from early season camas communities through a moderate level of disturbance and native succession. It is frequent on all the southern portions of the range of Garry oak ecosystems. The Garry oak – Miner's-lettuce community type occurs on gentle to steep slopes at various elevations across a wide range of microsites. They often have exposed coarse (granitic, gneiss) bedrock or surface rocks. Soils are usually Orthic Sombric Brunisols, composed of sandy loam to silt loam, with a deep, dark Ah horizon and Vermimull or Rhizomull surface humus form. Either a tree canopy or a tall shrub canopy may form the tallest oak layer. These oaks mostly have small diameters. On most sites, saplings are regenerating with light to moderate stocking levels and seedlings are moderately well stocked. Miner's-lettuce (*Montia perfoliata*) is important on all sites. Scotch broom* (*Cytisus scoparius*) and cleavers (*Galium aparine*) are important on most sites. Blue wildrye (*Elymus glaucus*), barren brome* (*Bromus sterilis*), Kentucky bluegrass* (*Poa pratensis*), Pacific snakeroot (*Sanicula crassicaulis*), great camas (*Camassia leichtlinii*), common chickweed* (*Stellaria media*), and California brome (*Bromus carinatus*) are less important on most sites.



| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

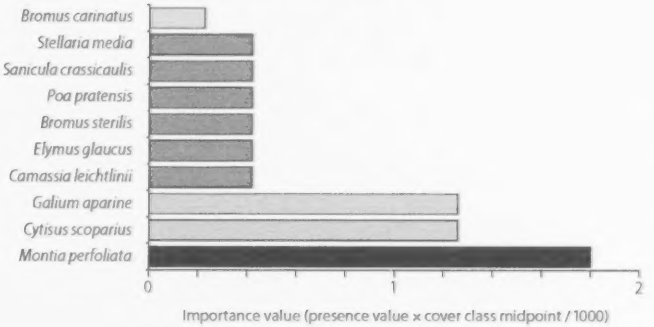
### Comments

This community type is not as easily noticed as the other showy early season communities, from which it is derived. The presence of deep Ah horizons partly distinguishes this community. It results from moderate disturbance to early season communities of this and the previous plant association.

**Note:** See the previous plant association for a description of the Garry oak – Blue wildrye (*Quercus garryana – Elymus glaucus*) community type Qggc-c47.

| Management Ranking | |
|---|---|
| Preservation priority | High |
| Regeneration potential | Moderate |
| Aesthetic appeal | Low to moderate |
| Susceptibility to disturbance | Moderately high |
| Prescribed fire potential | Moderate |
| Threats | High |
| Restoration potential | Very high |
| Restoration priority | High |

### Relative Importance Value of Major Species



## Qggc-c41 Garry oak – Purple peavine

*Quercus garryana – Lathyrus nevadensis*—native successional community type

### General Description

This community type occurs infrequently within the range, except in the northern Gulf Islands. These are mainly less exposed sites at low elevation with mesic moisture regime and light levels of natural disturbance with recovery. The Garry oak – Purple peavine community occupies gentle slopes on southerly aspects (east- to west-facing) with moderate to high bedrock surface rock exposure. Soils are Orthic Sombric Brunisols with Vermimull or Rhizomull humus, a dark Ah horizon, loam texture, and relatively low coarse fragment content. Garry oaks are found in a tree canopy of high cover and medium to large diameter. Regeneration consists of moderately stocked saplings on some sites and lightly stocked seedlings on most sites. Purple peavine (*Lathyrus nevadensis*), Pacific snakeroot (*Sanicula crassicaulis*), and orchardgrass* (*Dactylis glomerata*) are important on all sites; common snowberry (*Symphoricarpos albus*) and great camas (*Camassia leichtlinii*) on most sites. Barren fescue* (*Vulpia bromoides*), barren brome* (*Bromus sterilis*), Kentucky* bluegrass (*Poa pratensis*), common vetch* (*Vicia sativa*), and ribwort plantain* (*Plantago lanceolata*) are of lesser importance on most sites.

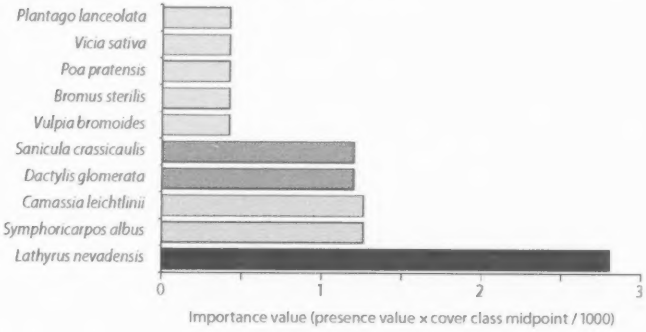
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

Most plots in this community type were classified in the parkland physiognomic type. Mesic ecological moisture regime, occurrence at low elevations and on concave sites, and low subsurface coarse fragments all contribute to distinguishing this community. It is suggested to result from the effects of light understorey disturbance and native succession on the previous community (Qggc-c47). An increase in disturbance could lead to the development of the invasive alien orchardgrass communities. One plot from Galiano Island was a krummholz, sea-edge stand, suggesting that there is also a relationship with Qgrf-c42, the Krummholz Garry oak – Roemer's fescue – American vetch subcommunity.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderately low |
| Aesthetic appeal | Very high |
| Susceptibility to disturbance | High |
| Prescribed fire potential | Very high |
| Threats | Very high |
| Restoration potential | Very high |
| Restoration priority | Very high |

### Relative Importance Value of Major Species



## Qggc-c13 Garry oak – Alaska oniongrass

*Quercus garryana – Melica subulata*—community type

### General Description

This community type occurs frequently across the range, except in the northern Gulf Islands. There is a bifold distribution between high and low elevations. These are cool, protected, or wetter sites, including basins and gentle topography. They have relatively deep, medium-textured soils with low or moderate percent coarse fragments. Included are gentle to moderate slopes at all aspects, but which tend to be southerly. They often have concave surfaces, a wide range of moisture regimes (subxeric to permesic), or exposure to wind, insolation, bedrock, and surface rocks. Soils are usually Orthic Sombric Brunisols with Vermimull humus, a deep, dark Ah horizon, gravelly sandy loam to loam texture, and low percent coarse fragments. Stands are usually in tree canopy form, and Douglas-fir is often found with the oaks, which have small to medium diameters. Most sites are well stocked with saplings and lightly stocked with seedlings. These sites have rather low vegetation diversity. Alaska oniongrass (*Melica subulata*) and Pacific snakeroot (*Sanicula crassicaulis*) are important on all sites; blue wildrye (*Elymus glaucus*) and cleavers (*Galium aparine*) are of lesser importance. Kentucky bluegrass* (*Poa pratensis*), common vetch* (*Vicia sativa*) and miner's-lettuce (*Montia perfoliata*) are of lesser importance on most sites.

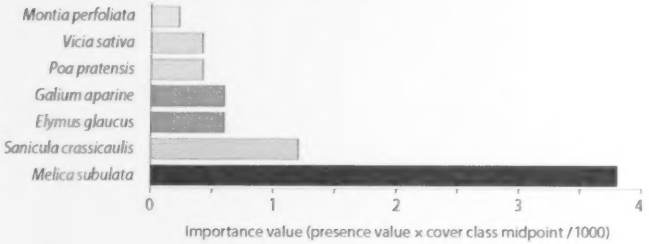
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

This community type is thought to occur on different types of sites than the several other late season grassy communities. Understorey composition may also reflect the influence of more complete, high-cover stand conditions. The Garry oak – Alaska oniongrass community type Qggc-c13 is one of the original communities from which invasive alien orchardgrass communities (c5, c28a, c28, c30, c49 in Erickson 1996, 1998) are derived.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderately high |
| Aesthetic appeal | High |
| Susceptibility to disturbance | High |
| Prescribed fire potential | High |
| Threats | Moderately high |
| Restoration potential | Very high |
| Restoration priority | High |

### Relative Importance Value of Major Species



## Qgos Garry oak – Oceanspray – Common snowberry

*Quercus garryana – Holodiscus discolor – Symphoricarpos albus*—plant association

### Key Features

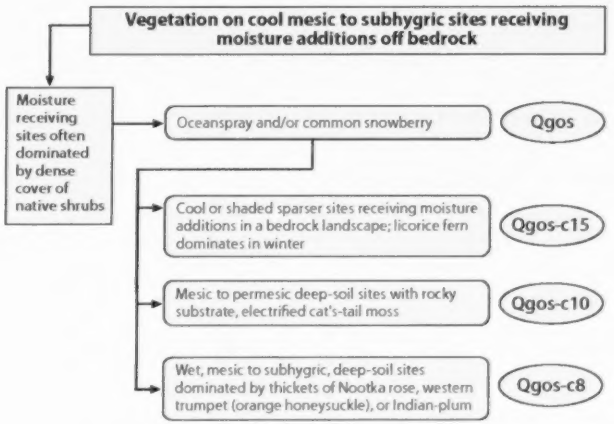
- Cool sites receiving moisture additions off bedrock
- Mesic to subhygric
- Deep-soil sites dominated by dense cover of native shrubs in thickets
- Oceanspray and/or common snowberry ≥ 11% cover

The Garry oak – Oceanspray – Common snowberry plant association is an amalgamation of four units (c8, c9, c10, c15) from Erickson (1996, 1998), one of which (c9) is eliminated here.

| Plant community types | Garry oak – Nootka rose – Common snowberry Qgos-c8<br>Garry oak – Oceanspray – Common snowberry – Licorice fern Qgos-c15 | Garry oak – (Douglas-fir) – Oceanspray – snowberry – Electrified cat's-tail moss Qgos-c10 |
|---|---|---|
| Native successional community types | None | |
| Plant subcommunities | None | |
| Phenological stages | Qgos-c15 is partly a winter season community | |
| Native successional community types | None | |
| Invasive alien community types | None [12] | |

Full keys are found in Appendices 1 and 2. Flow charts to the plant communities follow (cool mesic to subhygric sites receiving moisture additions off bedrock).

12 There is invasive alien vegetation, such as Himalayan blackberry, spurge-laurel, and English ivy, in these wetter areas but these highly disturbed stands were not sampled.


Vegetation on cool mesic to subhygric sites receiving moisture additions off bedrock
Moisture receiving sites often dominated by dense cover of native shrubs
Oceanspray and/or common snowberry
Qgos
Cool or shaded sparser sites receiving moisture additions in a bedrock landscape; licorice fern dominates in winter
Qgos-c15
Mesic to permesic deep-soil sites with rocky substrate, electrified cat's-tail moss
Qgos-c10
Wet, mesic to subhygric, deep-soil sites dominated by thickets of Nootka rose, western trumpet (orange honeysuckle), or Indian-plum
Qgos-c8

Notes: Defining species have at least 11% cover. Other details are in the text and the full keys at the back.

*Western trumpet honeysuckle stand, Uplands.*

**Sites on cool mesic to subhygric sites receiving moisture additions off bedrock**

- Moisture-receiving sites often dominated by dense cover of native shrubs — **Qgos**
  - Cool, protected aspects receiving moisture additions in a bedrock landscape, but convex or strongly drained with relatively xeric moisture regime; shallowly underlain by coarse bedrock, which is often exposed along with surface rocks; dominant fern and/or bryophyte growth in winter, distinctive root-mat of humus — **Qgos-c15**
  - Cool, protected, mesic to permesic deep-soil sites, including basins and gentle topography, dominated by Douglas-fir and bryophytes, especially in winter (sometimes compensating moisture on rocky substrates with high exposure of rock or bedrock or relatively shallow soils with high coarse fragments) — **Qgos-c10**
  - Low-elevation, wet, mesic to subhygric, deep-soil sites in the Saanich Peninsula, western shore, and Nanaimo-Duncan; high cover of Garry oak, dense cover of native shrubs in thickets; generally absent from areas accessible to deer grazing (sometimes high cover of exposed mineral soil, compensating moisture on steep south- and southwestern-facing slopes; coarse, nutrient-poor bedrock) — **Qgos-c8**

*Typical shrub thicket, University of Victoria.*

*Western trumpet honeysuckle.*

*Indian Plum.*

## Qgos Garry oak – Oceanspray – Common snowberry

*Quercus garryana – Holodiscus discolor – Symphoricarpos albus*—plant association

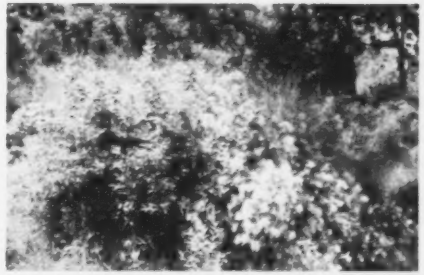
### General Description

These are cool, low-elevation, gentle, sometimes concave slopes that usually receive moisture influxes. They have deep soils and are dominated by a dense cover of native shrubs in thickets. Soil moisture regime tends toward subhygric. Some sites have moderately high surface dead wood and there may be exposure to wind, cool air, insolation, and seaspray. These soils are Orthic Sombric Brunisols with Vermimull humus, and deep, dark Ah horizons. The silt loam textures are distinctive—they have low percent coarse fragments and are without bedrock in the profile.

Oaks are found as a high-cover tree canopy of various diameters. Moderately to well-stocked saplings are regenerating on most sites. Seedling stocking is light and spotty. These sites appear as shrub thickets, and several shrubs species occupy both the low and tall shrub layers. Oceanspray (*Holodiscus discolor*), common snowberry (*Symphoricarpos albus*), and Nootka rose (*Rosa nutkana*) are important on most or all sites. The following are important on some sites: Indian-plum (*Oemleria cerasiformis*) in the low and tall shrub layer, western trumpet (*Lonicera ciliosa*), electrified cat's-tail moss (*Rhytidiadelphus triquetrus*), spurge-laurel* (*Daphne laureola*), orchardgrass* (*Dactylis glomerata*), blue wildrye (*Elymus glaucus*), Kentucky* bluegrass (*Poa pratensis*), cleavers (*Galium aparine*), and common vetch* (*Vicia sativa*).

For more detail, see community types Qgos-c10 and Qgos-c8.

| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |



*Oceanspray at Government House*

*Western trumpet honeysuckle, Thetis Lake Nature Sanctuary Association*

*Elkington, common snowberry stand*

## Qgos-c15 Garry oak – Oceanspray – Common snowberry – Licorice fern

*Quercus garryana – Holodiscus discolor – Symphoricarpos albus – Polypodium glycyrrhiza*—community type

### General Description

This community type is frequent within the Saanich Peninsula, western shore, and Nanaimo–Duncan portions of the range. These cool protected aspects receive moisture additions in a bedrock landscape, although convex and strongly drained with a relatively xeric moisture regime. They are shallowly underlain by coarse bedrock, which is often exposed along with surface rocks. Most distinctive is its dominant fern and bryophyte growth in winter and the root-mat of humus. This community type occurs on moderate to moderately steep northwest to northeast aspects with trifold moisture regimes (chart). All plots have granitic bedrock or surface rocks. Soils are Orthic Regosols with Orthic Rhizomull humus, and a shallow Ah horizon over bedrock. Sites have a tree canopy of small-diameter oaks. Regeneration of moderately stocked saplings and lightly stocked seedlings occurs on most sites. Oceanspray (*Holodiscus discolor*) and licorice fern (*Polypodium glycyrrhiza*) are important on most or all sites; common snowberry (*Symphoricarpos albus*) is less typical. Blue wildrye (*Elymus glaucus*) is of lesser importance on all sites. Great camas (*Camassia leichtlinii*) is important on most sites; Scotch broom* (*Cytisus scoparius*), cleavers (*Galium aparine*), and broom-moss (*Dicranum scoparium*) are of lesser importance.

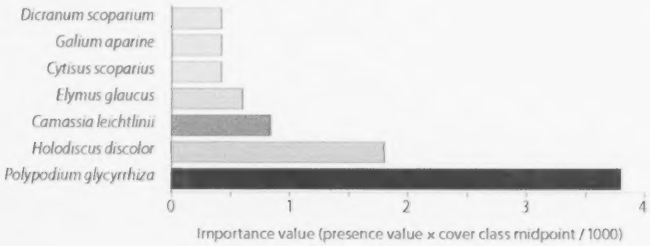
| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

### Comments

This community type is unique in that licorice fern grows over winter, dies back in mid-spring, and resumes growth again in late summer. This pattern is probably a good indicator both of the mildness of the coastal winters and of the winter-wet part of the modified Mediterranean climate. One distinguishing factor is the absence of this community type from the Gulf Islands, which may be controlled by greater deer grazing pressure. Another difference is its soil classification as Orthic Regosols (reflecting the shallow organic and Ah horizons over bedrock), the high surface exposure of granitic bedrock, and the occurrence on north-facing slopes. Rooting structure and humus formation associated with licorice fern are unique. The Garry oak – Oceanspray – Common snowberry – Licorice fern community type Qgos-c15 also has vegetation affinities with the native broom-moss communities of cool bedrock outcrops.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderate |
| Aesthetic appeal | Moderately high |
| Susceptibility to disturbance | Very high |
| Prescribed fire potential | Low |
| Threats | High |
| Restoration potential | Very high |
| Restoration priority | Moderately high |

### Relative Importance Value of Major Species



## Qgos-c10 Garry oak – Oceanspray – Common snowberry – Electrified cat's-tail moss

*Quercus garryana – Holodiscus discolor – Symphoricarpos albus – Rhytidiadelphus triquetris*—community type

### General Description

The Garry oak – Oceanspray – Common snowberry – Electrified cat's-tail moss community type occurs infrequently to moderately frequently on the Saanich Peninsula and the Nanaimo–Duncan areas.

These are cool, protected, mesic to permesic deep-soil sites with a rocky substrate. Sometimes there is compensating moisture, visible as seepage off toe slopes into basins or gentle topography from exposed rock or bedrock. Relatively shallow soils with high percent soil coarse fragments are also found. Generally, sites were submesic to permesic, on gentle slopes with southerly aspects. Some had a concave surface shape. There is moderate to high exposure of coarse (granitic, gneiss) bedrock. Soils are Orthic Sombric Brunisols with Vermimull humus, a deep, dark Ah horizon, gravelly loam to silt loam texture, and high percent coarse fragments. There is a tree canopy of small-diameter oaks, which are accompanied on most sites by lesser cover of Douglas-fir. Garry oak regeneration of moderate to well-stocked saplings is present on most sites. Seedlings are lightly stocked on all sites. Oceanspray (*Holodiscus discolor*), common snowberry (*Symphoricarpos albus*), and electrified cat's-tail moss (*Rhytidiadelphus triquetrus*) are important on all sites. Pacific snakeroot (*Sanicula crassicaulis*), cleavers (*Galium aparine*), and long-stoloned sedge (*Carex inops*) are of lesser importance on all sites. Big-leaved sandwort (*Moehringia macrophylla*) is also present on all sites. White fawn lily (*Erythronium oregonum*), tall Oregon-grape (*Mahonia aquifolium*), Scotch broom* (*Cytisus scoparius*), and California brome (*Bromus carinatus*) are of lesser importance on most sites. Blue wildrye (*Elymus glaucus*), orchardgrass* (*Dactylis glomerata*), American vetch (*Vicia americana*), chocolate lily (*Fritillaria affinis*), and common chickweed* (*Stellaria media*) are also present on most sites.

| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

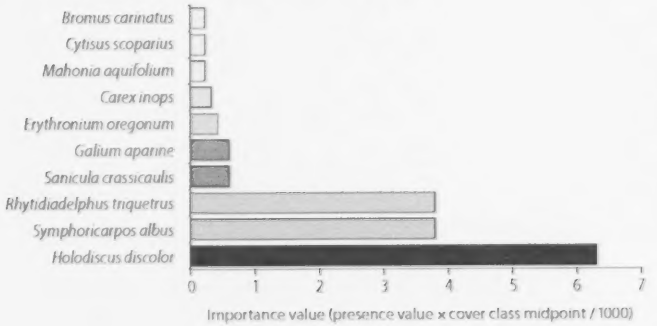
### Comments

These sites are unique in their presence of seepage. They receive additional moisture from the surrounding landscape, as indicated by their toe slope position, concave or slightly concave surface, or observations of seepage. Some of these sites have shrub thickets. This community is partly distinguished by its absence from the Gulf Islands. This community also encroaches on drier mesic sites, where increasing Douglas-fir cover has led to increasing moss cover, reduced plant diversity, and even the loss of overtopped Garry oak.

| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | High |
| Aesthetic appeal | Moderate |
| Susceptibility to disturbance | High |
| Prescribed fire potential | Low† |
| Threats | High |
| Restoration potential | Very high |
| Restoration priority | Moderately high |

† High for conversion to native herbaceous on drier sites.

### Relative Importance Value of Major Species



## Qgos-c8 Garry oak – Common snowberry – Nootka rose

*Quercus garryana – Symphoricarpos albus – Rosa nutkana*— community type

### General Description

This community type combines two previous subcommunities: c8, Oceanspray – Common snowberry – Western trumpet, and c9, Garry oak – Common snowberry – Nootka rose – Indian-plum (Erickson 1996, 1998). The community type occurs frequently across the range with the exception of the northern (old c8) and southern Gulf Islands (old c9). These are wet, mesic to subhygric, deep-soil sites at low elevation dominated by high cover of Garry oak and dense cover of native shrubs in thickets. This community type is generally absent from areas accessible to deer grazing. The soils are Orthic Sombric Brunisols with Vermimull humus, a deep, dark Ah horizon, and gravelly silt loam to loam texture. They have low percent coarse fragments and are without bedrock in the profile. Oaks are found as a tree canopy with various diameters. Moderately to well-stocked saplings are regenerating on most sites. Seedling stocking is light and spotty. These sites appear as shrub thickets, and several shrubs species occupy both the low and tall shrub layers. Common snowberry (*Symphoricarpos albus*) and Nootka rose (*Rosa nutkana*) are important on most or all sites, while orchardgrass* (*Dactylis glomerata*) is important on many sites. The following can be important on some sites: Indian-plum (*Oemleria cerasiformis*) in the low and tall shrub layers, western trumpet (*Lonicera ciliosa*), spurge-laurel* (*Daphne laureola*), blue wildrye (*Elymus glaucus*), Kentucky* bluegrass (*Poa pratensis*), cleavers (*Galium aparine*), and common vetch* (*Vicia sativa*).

| Moisture regime | Northern Gulf Islands | Nanaimo-Duncan | Southern Gulf Islands | Saanich Peninsula | Western shore |
|---|---|---|---|---|---|
| very xeric | | | | | |
| | | | | | |
| subxeric | | | | | |
| | | | | | |
| mesic | | | | | |
| | | | | | |
| subhygric | | | | | |

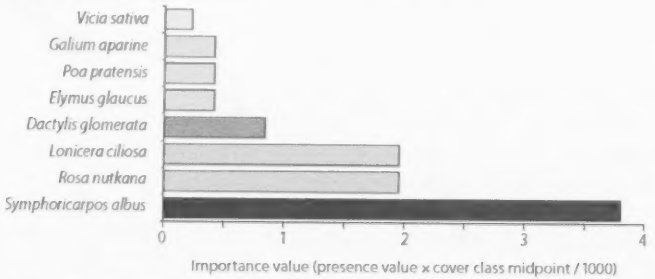
### Comments

These sites are multi-layered shrub thickets, often found near the sea-edge. This community type is partly distinguished by its occurrence on gentle slopes at all aspects at low elevations and by deep, dark Ah horizons. Although the successional role for this community has not been articulated, its distribution and development seem to be inversely related to deer populations, and possibly also to past livestock use. This suggests tential for replacement by spurge-laurel (*Daphne laureola*), Himalayan blackberry, ivy, and other invasive species.

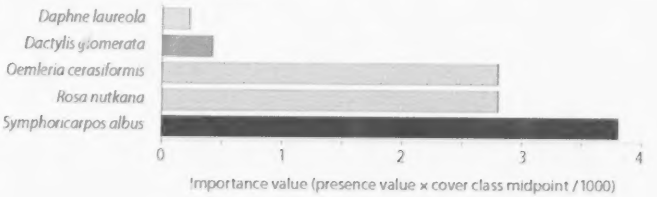
| Management Ranking | |
|---|---|
| Preservation priority | Very high |
| Regeneration potential | Moderate |
| Aesthetic appeal | Moderately high |
| Susceptibility to disturbance | Moderate |
| Prescribed fire potential | Low |
| Threats | Very high |
| Restoration potential | Very high |
| Restoration priority | Moderately high |

### Relative Importance Value of Major Species

*c8 from Erickson (1996, 1998)*




*c9 from Erickson (1996, 1998)*



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## APPENDIX 1 Vegetation Keys to Garry Oak Plant Associations and Communities[13]

**Synopsis**

**Mostly native dominant species**
**Bedrock landscapes**
Warm aspects[14]: **Grey rock-moss – Wallace's selaginella…Qgrm**
Cool aspects: **Broom-moss...Qgbm**
Dry colluvial sites: **Hairy honeysuckle...Qghh**
**Cool or wet sites, dense shrubs: Oceanspray – Common snowberry...Qgos**
**Gentle to steep slopes with native herbaceous vegetation**
Exposed subxeric sites: **Roemer's fescue...Qgrf**
Moderate submesic sites: **Common camas – Blue wildrye...Qgcc**
Lower slope mesic sites: **Great camas – Blue wildrye...Qggc**
If not, see 2 below.

### Full Vegetation Key to Garry Oak Plant Associations and Communities[15]

1 Mostly native dominant species, Scotch broom[4] absent or of secondary importance ≤11% cover:

1a Bedrock landscapes with prominent moss cover and herbaceous vegetation

1a1 Warm aspects on exposed south- and west-facing slopes, grey rock-moss dominant, Wallace's selaginella and/or grey rock-moss ≥ 11% cover, the other of which >2% cover: Garry oak – Grey rock-moss – Wallace's selaginella plant association Qgrm

1a2 Cool aspects and protected north- and east-facing slopes, broom-moss ≥ 11% cover: Garry oak – Broom-moss plant association Qgbm:

1a2a Early season (April 1 to May 15) sea blush ≥ 11% cover: Garry oak – Broom-moss – Sea blush phenological community type Qgbm-c51[16]

1a2b Small-leaved montia ≥ 11% cover: Garry oak – Broom-moss – Small-leaved montia community type Qgbm-c11

1a2c Broad-leaved stonecrop ≥ 11% cover: Garry oak – Broom-moss – Broad-leaved stonecrop community type Qgbm-c45

1b Dry, colluvial sites, often at the margins of bedrock landscapes or grassy slopes, dominated by native shrubs, hairy honeysuckle ≥ 11% cover ≥ other species except as below: Garry oak – Hairy honeysuckle plant association Qghh

1b1 Tall Oregon-grape ≥ 11% cover ≥ other species: Garry oak – Tall Oregon-grape plant community type Qghh-c26

1c Cool sites receiving moisture additions off bedrock, and wet, mesic to subhygric, deep-soil sites dominated by dense cover of native shrubs in thickets, oceanspray and/or common snowberry ≥ 11% cover: Garry oak – Oceanspray – Common snowberry plant association Qgos

13 This key is facultative, not dichotomous.
14 "Garry oak" and "plant association" are left out of the synopsis for brevity.
15 At each stage of the key, see next for further choices, or go to 2.
16 The second part of the plant community code derives from Erickson (1996, 1998).

1c1 Cool or shaded sites receiving moisture additions in a bedrock landscape, licorice fern ≥ 11% cover[17]: Garry oak – Oceanspray – Common snowberry – Licorice fern plant community type Qgos-c15

1c2 Mesic to permesic deep-soil sites with rocky substrate, electrified cat's-tail moss ≥ 11% cover (usually > 26%): Garry oak – Oceanspray – Common snowberry – Electrified cat's-tail moss plant community type Qgos-c10

1c3 Wet, mesic to subhygric, deep-soil sites dominated by dense cover of native shrubs in thickets, Nootka rose usually dominant, western trumpet (orange honeysuckle) or Indian-plum often ≥ 11% cover: Garry oak – Nootka rose – Common snowberry plant community type Qgos-c8

1d Gentle to steep slopes with soil mantle dominated by native herbaceous vegetation

1d1 Exposed subxeric sites on moderate to steep, mid- and upper slopes with bedrock exposure, Roemer's fescue ≥ 11% cover: Garry oak – Roemer's fescue plant association: Qgrf

1d1a Seaside location with oaks usually in krummholz form, American vetch usually ≥ 11%: Krummholz Garry oak – Roemer's fescue – American vetch subcommunity Qgrf-c42

1d1b Small-headed clover ≥ 11% cover: Garry oak – Roemer's fescue – Small-headed clover subcommunity Qgrf-c27

1d1c Field chickweed ≥ 11% cover, Roemer's fescue usually ≥ 11%, other species ≤ 11%: Garry oak – Roemer's fescue – Field chickweed subcommunity Qgrf-c25

1d2 Submesic gentle to moderate mid-slopes, light to moderate shrub understorey, common camas (April 1 to May 15) and/ or blue wildrye (May 15 onwards) ≥ 11% cover ≥ other herb species: Garry oak – Common camas – Blue wildrye plant association Qgcc

1d2a Early season[18] (April 1 to May 15): herbaceous vegetation, especially bulb-forming species, common camas ≥ 11% cover: Garry oak – Common camas phenological plant community type Qgcc-c37a

1d2a1 White fawn lily ≥ 11% cover: Garry oak – Common camas – White fawn lily phenological subcommunity Qgcc-c35a

1d2a2 Broad-leaved shootingstar ≥ 11% cover, common camas usually ≥ 11% cover: Garry oak – Common camas – Broad-leaved shootingstar phenological subcommunity Qgcc-c35b

17 Licorice fern dies back in late spring and summer and grows continuously from late summer, through the winter, into spring. In summer, abundant rooted stalks and residues remain from the fronds.

18 Stands can be keyed in the early season between April 1 and May 15 or when plant phenology allows. A site may also be keyed to a later season classification and thus have two identified communities, but they are unified under one plant association.

1d2a3 Western buttercup ≥ 11% cover, common camas usually ≥ 11% cover: Garry oak – Common camas – Western buttercup phenological subcommunity Qgcc-c37b

1d2c Late season classification (after May 15), herbaceous grassy vegetation

1d2c1 Blue wildrye ≥ 11% cover ≥ other herb species: Garry oak – Blue wildrye plant community type Qgcc-c47

1d2c2 Long-stoloned sedge ≥ 11% cover ≥ other species: Garry oak – Long-stoloned sedge plant community type Qgcc-c14

1d2c3 California brome ≥ 11% cover, other species various: Garry oak – California brome native successional plant community type Qgcc-c43

1d3 Mesic to submesic gentle lower slopes, light to moderate native shrub understorey, great camas (April 21 to May 15) and/or blue wildrye (May 15 onwards) ≥ 11% cover ≥ other herb species: Garry oak – Great camas – Blue wildrye plant association Qggc

1d3a Early season classification[19] (April 21 to May 15): herbaceous forb vegetation, especially bulb-forming species

1d3a1 Great camas ≥ 11% cover: Garry oak – Great camas phenological plant community type Qggc-c36

1d3a2 Miner's-lettuce ≥ 11% cover: Garry oak – Miner's-lettuce native successional community type Qggc-c48

1d3b Late season classification (after May 15), herbaceous grassy vegetation

1d3b1 Blue wildrye ≥ 11% cover, ≥ other herb species: Garry oak – Blue wildrye plant community type Qggc-c47

1d3b2 Alaska oniongrass ≥ 11% cover ≥ other species: Garry oak – Alaska oniongrass community type Qggc-c13

1d3b3 Purple peavine ≥ 11% cover, other species various: Garry oak – Purple peavine native successional community type Qggc-c41

2 If dominated by native species, repeat this key, examine keys within the closest plant association, and select the best fit. If dominated by introduced species, see Appendix 4, or the table with invasive alien communities under the plant association. If there is still no fit, name, describe, and report it as a new community.

19 Stands can be keyed in the early season section between April 1 and May 15 or when plant phenology allows. A site may also be keyed to a later season classification and thus have two identified plant communities.

**A** Bedrock or other rocky xeric landscapes, usually dominated by bryophytes or sparse, deep-rooted shrubs

Primarily uniform bedrock, usually dominated by bryophytes:

Warm aspects, exposed sites on rapidly drained topography, high site mineral soil exposure, trees if present may include Douglas-fir and arbutus at relatively high cover: Garry oak – Grey rock-moss – Wallace's selaginella plant association Qgrm

Cool aspects, topographically protected sites, but with high mineral soil exposure and high percent soil coarse fragments: Garry oak – Broom-moss plant association Qgbm

Dry colluvial sites primarily underlain by fractured rock talus; if bedrock then cracked and fissured, not uniform; usually dominated by sparse, deep-rooted shrubs: Garry oak – Hairy honeysuckle plant association Qghh

**B** Less xeric landscape with a surface soil mantle

Usually dominated by grassy herbaceous species:

Soil coarse fragments with high percentage: Garry oak – Roemer's fescue plant association Qgrf

Gentle to steep slopes with soil mantle, usually dominated by native herbaceous vegetation:

Less xeric, often submesic gentle to moderate mid-slopes, sometimes with high mineral soil exposure cover; light to moderate native shrub understorey, usually dominated in early season by herbaceous forb species or later by herbaceous grasses: Garry oak – Common camas – Blue wildrye plant association Qgcc

Mesic to submesic gentle lower slopes, sometimes cool, protected, or wetter topographic sites including basins and gentle topography; soils relatively deep, medium-textured, with low or moderate percent coarse fragments; light to moderate native shrub understorey; usually dominated in early season by herbaceous forb species or later by herbaceous grasses: Garry oak – Great camas – Blue wildrye plant association Qggc

**C** Wetter topographic sites; cool sites receiving moisture additions off bedrock, and wet, mesic to subhygric, deep-soil sites usually dominated by dense cover of native shrubs, including dense, multi-layered native shrub thickets: Garry oak – Oceanspray – Common snowberry plant association Qgos

20 This environmental key is a first approximation that combines field observation with analytical results (Erickson 2002b). It is facultative rather than dichotomous, and its general nature suggests the need to pick the best fit from among the choices.

**Garry oak – Grey rock-moss – Wallace's selaginella plant association** Qgrm
none

**Garry oak – Broom-moss plant association** Qgbm

Garry oak – Broom-moss – Small-leaved montia plant community type Qgbm-c11[21]

Garry oak – Broom-moss – Broad-leaved stonecrop plant community type Qgbm-c45

Garry oak – Broom-moss – Sea blush phenological community type Qgbm-c51

**Garry oak – Hairy honeysuckle plant association** Qghh

Garry oak – Tall Oregon-grape plant community type Qghh-c26

**Garry oak – Roemer's fescue plant association** Qgrf

Garry oak – Roemer's fescue – Field chickweed plant subcommunity Qgrf-c25

Garry oak – Idaho fescue – Small-headed clover plant subcommunity Qgrf-c27

Krummholz Garry oak – Roemer's fescue – American vetch plant subcommunity Qgrf-c42

**Garry oak – Common camas – Blue wildrye plant association** Qgcc

Garry oak – Common camas phenological plant community type Qgcc-c37a

Garry oak – Common camas – White fawn lily phenological subcommunity Qgcc-c35a

Garry oak – Common camas – Broad-leaved shootingstar phenological subcommunity Qgcc-c35b

Garry oak – Common camas – Western buttercup phenological subcommunity Qgcc-c37b

Garry oak – Blue wildrye plant community type Qgcc-c47

Garry oak – Long-stoloned sedge plant community type Qgcc-c14

Garry oak – California brome native successional plant community type Qgcc-c43

**Garry oak – Great camas – Blue wildrye plant association** Qggc

Garry oak – Great camas phenological plant community type Qggc-c36

Garry oak – Blue wildrye plant community type Qggc-c47

Garry oak – Alaska oniongrass plant community type Qggc-c13

Garry oak – Miner's-lettuce native successional (phenological) community type Qgcc-c48

Garry oak – Purple peavine native successional community type Qggc-c41

21 These alphanumeric numbers are the equivalent communities in Erickson (1996, 1998), where more detail can be found.

**Garry oak – Oceanspray – Common snowberry plant association** Qgos

Garry oak – Oceanspray – Common snowberry – Licorice fern plant community type Qgos-c15

Garry oak – Oceanspray – Common snowberry – Electrified cat's-tail moss plant community type Qgos-c10

Garry oak – Nootka rose – Common snowberry plant community type Qgos-c8

**Summary of plant associations and their communities**

| Plant associations (7) | No. of native community types | No. of native subcommunities |
|---|---|---|
| Garry oak - Grey rock-moss - Wallace's selaginella | 0 | |
| Garry oak - Broom-moss | 3 | |
| Garry oak - Hairy honeysuckle | 1 | |
| Garry oak - Roemer's fescue | 0 | 3 |
| Garry oak - Common camas - Blue wildrye | 5 | 3 |
| Garry oak - Great camas - Blue wildrye | 5 | |
| Garry oak - Oceanspray - Common snowberry | 3 | |
| **Total** [22] | **17** | **6** |

22 These totals are higher than the total above because some community types are repeated across the plant associations.

**APPENDIX 4** Garry Oak Plant Associations and Invasive Alien Communities (from Erickson 1996, 1998)[23]

| | | |
|---|---|---|
| **Garry oak – Grey rock-moss – Wallace's selaginella plant association Qgrm** | | |
| Invasive alien subcommunities[24] | **Garry oak – Grey rock-moss – Annual fescue*** [25] (c50) (includes Garry oak – Scotch broom* – Grey rock-moss – Annual fescue* – Hairgrass* (c3)) | **Garry oak – Scotch broom* – Grey rock-moss** (c17) (includes Garry oak – Scotch broom* – Grey rock-moss – Cheatgrass* (c22)) |
| **Garry oak – Broom-moss plant association Qgbm** | | |
| Invasive alien communities | none | |
| **Garry oak – Hairy honeysuckle plant association Qghh** | | |
| Invasive alien community types | **Garry oak – Barren brome** (c23) | **Garry oak – Hedgehog dogtail*** (c21) |
| | **Garry oak – Scotch broom* – Hedgehog dogtail*** (c2) | |
| **Garry oak – Roemer's fescue plant association Qgrf** | | |
| Invasive alien community types | **Garry oak – Hedgehog dogtail*** (c21) | **Garry oak – Scotch broom* – Hedgehog dogtail*** (c2) |
| **Garry oak – Common camas – Blue wildrye plant association Qgcc** | | |
| Invasive alien community types | **Garry oak – Sweet vernalgrass*** (c31a) | **Garry oak – Scotch broom* – Kentucky bluegrass*** (c4) |
| | **Garry oak – Scotch broom* – Sweet vernalgrass*** (c31b) | |
| Invasive alien subcommunities | **Garry oak – Barren brome*** (c23) | **Garry oak – Kentucky bluegrass* – Common vetch*** (c29a) |
| **Garry oak – Great camas – Blue wildrye plant association Qggc** | | |
| Invasive alien community types | **Garry oak – Scotch broom* – Blue wildrye** (c6) | **Garry oak – Orchardgrass* – Tall oatgrass*** (c30) |
| | **Garry oak – Orchardgrass* – Redtop hairgrass*** (c49) | |
| Invasive alien subcommunities | **Garry oak – Orchardgrass*** (c28a and b) | **Garry oak – Scotch broom* – Orchardgrass*** (c5) |
| **Garry oak – Oceanspray – Common snowberry plant association Qgos** | | |
| Invasive alien communities | none[26] | |

23 There is also further overlap in occurrence of the invasive alien communities than shown.
24 Invasive alien community types are named but not described here. Community numbers are from Erickson (1996, 1998, which see for a description).
25 * = introduced (non-native) species.
26 Invasive alien vegetation, such as Himalayan blackberry, spurge-laurel, and English ivy, grow in these wetter areas, but these highly disturbed stands were outside the scope of our sampling.

**Similarity Analysis and Thresholds**

The similarity of communities (IS) was analyzed with pairwise adjusted Motyka Index of Similarity (ISMO) comparisons (Erickson 1996, 1998). This method considers similarities versus differences considering both cover and constancy. Values in the original analysis ranged from ISMO = 0 to ISMO = 1.85. Thresholds were developed and used here based on a tolerance of ISMO = ISTD (Standard Deviation) for valid plant community types; and ISMO=2STD for subcommunities. Values of ISMO > 2STD led to combinations of communities. Thresholds and their interpretation were as follows: ISMO < 0.2 – retain as separate taxa (e.g., plant association); ISMO > 0.2 to 0.96 – community type difference; ISMO > 0.96 to 1.34 – subcommunity difference; ISMO > 1.34 – combine. Only the results that explain classification changes compared with Erickson (1996, 1998) are given here.

**Classification Notes**

**Garry oak – Broom-moss (*Quercus garryana – Dicranum scoparium*) plant association: Qgbm**

The plant community types Qgbm-c45 and -c11 have their level of classification raised because of mid-range IS (~0.4) values. The community type Qgbm-c51 was designated as phenological because it was previously grouped with the early season communities and could be attributed to the plant association (c52 in Erickson 1996, 1998) in late season. There is a scattering of Scotch broom* in this habitat but not enough to define invasive alien communities. One community has been excluded from a temporary placement here and its name not maintained: *Quercus garryana – Dicranum scoparium – Polypodium glycyrrhiza* (= c15; Erickson 1996, 1998). It is found below Qgos-c15 with the wet shrub thicket communities.

**Garry oak – Roemer's fescue (*Quercus garryana – Festuca roemeri*[27]) plant association: Qgrf**

The Krummholz Garry oak – Roemer's fescue – American vetch subcommunity Qgrf-c42 is not separated at a higher level because it is similar enough to IS > 0.96 to remain here as a subcommunity.

**Garry oak – Common camas – Blue wildrye (*Quercus garryana – Camassia quamash – Elymus glaucus*) plant association: Qgcc**

The invasive alien subcommunities, Garry oak – barren brome* (c23) and Garry oak – Kentucky bluegrass* – common vetch* (c29a) (Erickson 1996, 1998), are placed as subcommunities here based on their similarity IS > 1.0.

**Garry oak – Great camas – Blue wildrye (*Quercus garryana – Camassia leichtlinii – Elymus glaucus*) plant association: Qggc**

The suggestion of using *Bromus sterilis* in this plant association name (i.e., "*Quercus garryana – Camassia leichtlinii – Bromus sterilis*") was not followed here because it denotes an invasive alien community, and one that usually occurs on drier sites. The invasive alien subcommunity above, c28, is a combination of 28a with c28b from Erickson (1996, 1998) based on their high similarity value IS > 1.34.

27 *Festuca idahoensis* is equivalent and is covered here under *F. roemeri*.

**Garry oak – Oceanspray – Common snowberry (*Quercus garryana – Holodiscus discolor – Symphoricarpos albus*) plant association: Qgos**
Oceanspray was added and Nootka rose dropped from the plant association name with the addition of two communities and the combination of the other two. The Garry oak – Nootka rose – Common snowberry community type Qgos-c8 is a combination of the *Quercus garryana – Symphoricarpos albus – Rosa nutkana – Lonicera ciliosa* (old c8) and the *Quercus garryana – Symphoricarpos albus – Rosa nutkana – Oemleria cerasiformis* (c9) subcommunities from Erickson (1996, 1998). They are combined here because of their high similarity (IS > 1.34). Surveyors can still use their judgement as to whether to record these separately.

Garry oak – (Douglas-fir) – Oceanspray – Snowberry – Electrified cat's-tail moss Qgos-c10 is included here as similar enough (IS > 0.20 compared with old c8) to fit into this plant association. Note that it also functions as a native successional community type where it increases or invades drier sites outside the area of this plant association. Garry oak – Oceanspray – Common snowberry – Licorice fern Qgos-c15 is included here because it is similar enough (IS > 0.2) to c10 to be in the same plant association. It is nonetheless still distinctive for the winter growth of its dominant fern, which probably indicates both the mildness of the coastal winters and of the winter-wet part of the modified Mediterranean climate.

| Scientific Name | Qgrm | Qgbm | Qghh | Qgrf | Qgcc | Qggc | Qgos | Common Name |
|---|---|---|---|---|---|---|---|---|
| **Tree Layer** | | | | | | | | |
| *Quercus garryana* | ▮▮▮▮▮ | ▮▮▮▮▮ | ▮▮▮▮▮ | ▮▮▮▮▮ | ▮▮▮▮▮ | ▮▮▮▮▮ | ▮▮▮▮▮ | Garry oak |
| **Shrub Layer** | | | | | | | | |
| *Quercus garryana* | ▮▮▮▮▮ | ▮▮▮▮▮ | ▮▮▮▮▮ | ▮▮▮▮▮ | ▮▮▮▮▮ | ▮▮▮▮▮ | ▮▮▮▮▮ | Garry oak |
| *Lonicera hispidula* | ▮▮ | ▮ | ▮▮▮▮▮ | ▮▮▮ | ▮ | ▮▮ | ▮▮ | hairy honeysuckle |
| *Holodiscus discolor* | | ▮▮▮▮ | ▮▮ | ▮▮ | ▮▮ | ▮▮ | ▮▮▮▮▮ | oceanspray |
| *Mahonia aquifolium* | | ▮▮ | ▮▮▮▮ | ▮ | ▮ | ▮▮ | ▮▮ | tall Oregon-grape |
| *Symphoricarpos albus* | | ▮▮▮ | ▮▮▮ | ▮▮ | ▮▮▮▮ | ▮▮▮▮ | ▮▮▮▮▮ | common snowberry |
| *Rosa nutkana* | | ▮ | ▮ | | ▮▮ | ▮ | ▮▮▮▮ | Nootka rose |
| *Oemleria cerasiformis* | | | | | ▮ | | ▮▮▮ | Indian-plum |
| *Lonicera ciliosa* | | | | | | | ▮▮▮ | western trumpet honeysuckle |
| **Herb Layer** | | | | | | | | |
| *Bromus carinatus* | ▮▮ | ▮▮ | ▮▮ | ▮▮▮ | ▮▮ | ▮▮ | ▮▮ | California brome |
| *Carex inops* | ▮▮▮ | ▮ | ▮▮ | ▮▮▮ | ▮▮▮▮ | ▮▮ | ▮ | long-stoloned sedge |
| *Elymus glaucus* | ▮▮ | ▮▮ | ▮▮▮ | ▮▮▮ | ▮▮▮ | ▮▮▮▮ | ▮▮ | blue wildrye |
| *Festuca roemerii* | ▮▮ | ▮ | ▮ | ▮▮▮▮ | ▮▮ | ▮ | ▮ | Roemer's fescue |
| *Galium aparine* | ▮ | ▮▮▮ | ▮▮▮ | ▮▮▮ | ▮▮ | ▮▮▮ | ▮▮ | cleavers |
| *Vicia americana* | ▮ | ▮ | ▮ | ▮▮▮ | ▮ | ▮ | ▮ | American vetch |
| *Cerastium arvense* | ▮▮ | ▮ | ▮▮ | ▮▮▮ | ▮▮ | ▮▮ | | field chickweed |
| *Luzula comosa* var. *comosa* | ▮▮ | ▮ | ▮ | ▮ | ▮ | | | Pacific wood-rush |
| *Selaginella wallacei* | ▮▮▮▮▮ | ▮ | ▮ | ▮▮ | | | | Wallace's selaginella |
| *Clarkia amoena* | ▮ | | | | | | | farewell-to-spring |
| *Koeleria macrantha* | ▮▮ | | | | | | | junegrass |
| *Eriophyllum lanatum* | ▮ | | ▮ | | | | | woolly eriophyllum |
| *Collinsia parviflora* | ■■ | | | | ■ | | | small-flowered blue-eyed Mary |
| *Lotus micranthus* | ■■ | | | ■ | ■ | | | small-flowered birds-foot trefoil |
| *Dodecatheon hendersonii* | ■■ | | | ■■ | ■■ | | ■ | broad-leaved shootingstar |
| *Lomatium triternatum* | ■ | ■ | | | ■ | | | nine-leaved desert-parsley |
| *Sedum spathulifolium* | ■ | ■■■ | | ■ | | | | broad-leaved stonecrop |
| *Delphinium menziesii* | | ■ | | | | | | Menzies' larkspur |

| Scientific Name | Qgrm | Qgbm | Qghh | Qgrf | Qgcc | Qggc | Qgos | Common Name |
|---|---|---|---|---|---|---|---|---|
| *Heuchera micrantha* | | ■ | | | | | | small-flowered alumroot |
| *Lomatium utriculatum* | | ■ | | ■ | ■ | | | spring gold |
| *Lathyrus nevadensis* | | ▮ | | | ▮ | ▮ | ▮ | purple peavine |
| *Erythronium oregonum* | | ▮ | | | ▮▮▮ | | ▮ | white fawn lily |
| *Brodiaea coronaria* | | ▮ | ▮ | ▮ | ▮▮ | ▮ | | harvest brodiaea |
| *Claytonia perfoliata* | | ▮▮▮ | | ▮ | ▮ | ▮▮ | ▮▮ | miner's-lettuce |
| *Camassia leichtlinii* | | ▮▮▮ | ▮ | ▮▮ | ▮ | ▮▮▮ | ▮▮▮ | great camas |
| *Camassia quamash* | | ▮▮ | ▮ | ▮ | ▮▮▮▮ | ▮ | ▮▮ | common camas |
| *Melica subulata* | | ▮▮ | ▮▮ | ▮ | ▮▮ | ▮▮▮▮ | ▮▮ | Alaska oniongrass |
| *Sanicula crassicaulis* | | ▮▮ | ▮▮▮ | ▮▮▮ | ▮▮ | ▮▮▮ | ▮▮ | Pacific sanicle |
| *Montia parvifolia* | | ▮▮▮▮ | | | ▮ | | ▮ | small-leaved montia |
| *Nemophila parviflora* | | ▮ | ▮ | ▮ | | ▮ | ▮ | small-flowered nemophila |
| *Rubus ursinus* | | ▮ | ▮ | | ▮ | | ▮ | trailing blackberry |
| *Osmorhiza berteroi* | | ▮ | ▮ | | ▮ | ▮▮ | | mountain sweet-cicely |
| *Plectritis congesta* | | ▮▮▮ | | | ▮ | | | sea blush |
| *Polypodium glycyrrhiza* | | ▮▮ | | | | ▮ | ▮▮▮▮ | licorice fern |
| *Clinopodium douglasii* | | | ▮▮ | ▮▮ | ▮ | | ▮ | yerba buena |
| *Danthonia californica* | | | ▮ | | ▮ | ▮ | | California oatgrass |
| *Trifolium microcephalum* | | | ▮ | ▮▮▮ | | | ▮ | small-headed clover |
| *Trifolium oliganthum* | | | | ▮ | | | | few-flowered clover |
| *Ranunculus occidentalis* | | | | ▮ | ▮▮▮ | ▮ | | western buttercup |
| **Moss Layer** | | | | | | | | |
| *Racomitrium canescens* | ▮▮▮▮▮ | ▮ | ▮ | ▮▮ | ▮▮ | ▮ | ▮▮ | grey rock-moss |
| *Polytrichum juniperinum* | ▮▮▮ | ▮▮ | | ▮ | ▮▮ | | ▮▮ | juniper haircap moss |
| *Dicranum scoparium* | ▮ | ▮▮▮▮ | ▮ | ▮▮ | ▮▮ | ▮ | ▮▮ | broom-moss |
| *Eurhynchium oreganum* | | ▮▮ | ▮ | ▮ | ▮ | ▮▮ | ▮▮ | Oregon beaked-moss |
| *Rhytidiadelphus triquetrus* | | ▮▮▮▮ | ▮ | ▮ | ▮▮ | ▮▮ | ▮▮▮ | electrified cat's-tail moss |

| | | | Qgrm<br>Comm. types<br>C46 | |
|---|---|---|---|---|
| | Layer | Scientific Name | Pres - Cover | Common Name |
| **Trees** | | | | |
| | A | *Pseudotsuga menziesii* | 0.75 - 10.50 | Douglas-fir |
| | A | *Quercus garryana* | 0.75 - 33.00 | Garry oak |
| **Shrubs** | | | | |
| | B1 | *Quercus garryana* | 0.75 - 24.75 | Garry oak |
| | B2 | *Quercus garryana* | 0.75 - 6.13 | Garry oak |
| | B2 | *Lonicera hispidula* | 0.50 - 6.00 | hairy honeysuckle |
| | B2 | *Cytisus scoparius* | 0.50 - 4.63 | Scotch broom |
| | B2 | *Paxistima myrsinites* | 0.50 - 0.25 | falsebox |
| **Herbs** | | | | |
| | C | *Aira caryophyllea* | 0.50 - 0.25 | silver hairgrass |
| | C | *Aira praecox* | 0.75 - 1.75 | early hairgrass |
| | C | *Allium cernuum* | 0.50 - 0.25 | nodding onion |
| | C | *Bromus carinatus* | 1.00 - 4.63 | California brome |
| | C | *Bromus hordeaceus* ssp. *hordeaceus* | 0.50 - 1.63 | soft brome |
| | C | *Bromus sterilis* | 0.50 - 14.00 | barren brome |
| | C | *Bromus tectorum* | 0.50 - 4.63 | cheatgrass |
| | C | *Carex inops* | 0.50 - 9.00 | long-stoloned sedge |
| | C | *Cerastium arvense* | 0.50 - 4.63 | field chickweed |
| | C | *Clarkia amoena* | 0.50 - 1.63 | farewell-to-spring |
| | C | *Collinsia parviflora* | 0.75 - 3.13 | small-flowered blue-eyed Mary |
| | C | *Crepis* sp. | 0.75 - 0.38 | |
| | C | *Elymus glaucus* | 1.00 - 3.25 | blue wildrye |
| | C | *Eriophyllum lanatum* | 0.75 - 1.75 | woolly eriophyllum |
| | C | *Festuca idahoensis* | 0.50 - 3.00 | Idaho fescue |
| | C | *Galium aparine* | 0.50 - 1.63 | cleavers |
| | C | *Koeleria macrantha* | 0.50 - 6.00 | junegrass |
| | C | *Lomatium triternatum* | 0.50 - 1.63 | nine-leaved desert-parsley |
| | C | *Lotus micranthus* | 0.75 - 3.13 | small-flowered birds-foot trefoil |
| | C | *Luzula comosa* var. *comosa* | 0.75 - 4.75 | Pacific wood-rush |
| | C | *Pentagramma triangularis* | 0.75 - 0.38 | goldenback fern |
| | C | *Rumex acetosella* | 0.75 - 0.38 | sheep sorrel |
| | C | *Selaginella wallacei* | 1.00 - 25.00 | Wallace's selaginella |
| | C | *Vulpia bromoides* | 0.75 - 4.75 | barren fescue |
| **Mosses and Lichens** | | | | |
| | D | *Polytrichum juniperinum* | 0.75 - 10.50 | juniper haircap moss |
| | D | *Quercus garryana* | 1.00 - 3.25 | Garry oak |
| | D | *Racomitrium canescens* | 0.75 - 29.75 | grey rock-moss |
| **Additional species < 50% presence** | | | | |
| | B1 | *Arbutus menziesii* | 0.25 - 4.50 | arbutus |
| | B1 | *Pseudotsuga menziesii* | 0.25 - 9.50 | Douglas-fir |
| | B2 | *Arbutus menziesii* | 0.25 - 0.13 | arbutus |
| | B2 | *Mahonia aquifolium* | 0.25 - 0.13 | tall Oregon-grape |
| | B2 | *Pseudotsuga menziesii* | 0.25 - 4.50 | Douglas-fir |
| | B2 | *Symphoricarpos albus* | 0.25 - 0.13 | common snowberry |
| | C | *Anthoxanthum odoratum* | 0.25 - 0.13 | sweet vernalgrass |
| | C | *Brodiaea coronaria* | 0.25 - 0.13 | harvest brodiaea |
| | C | *Bromus rigidus* | 0.25 - 4.50 | rip-gut brome |
| | C | *Camassia quamash* | 0.25 - 0.13 | common camas |
| | C | *Claytonia perfoliata* | 0.25 - 0.13 | miner's-lettuce |

Note: Presence ≥ 0.60 0 5, 5.1 10, 10.1 25, > 25

| | | Qgrm | |
|---|---|---|---|
| | | Comm. types | |
| | | C46 | |
| Layer | Scientific Name | Pres - Cover | Common Name |
| C | *Clinopodium douglasii* | 0.25 - 0.13 | yerba buena |
| C | *Cynosurus echinatus* | 0.25 - 4.50 | hedgehog dogtail |
| C | *Dodecatheon hendersonii* | 0.25 - 4.50 | broad-leaved shootingstar |
| C | *Galium aparine* | 0.25 - 0.13 | cleavers |
| C | *Geranium molle* | 0.25 - 0.13 | dovefoot geranium |
| C | *Hypochaeris radicata* | 0.25 - 0.13 | hairy cat's-ear |
| C | *Lomatium utriculatum* | 0.25 - 0.13 | spring gold |
| C | *Nemophila parviflora* | 0.25 - 0.13 | small-flowered nemophila |
| C | *Piperia elegans* | 0.25 - 0.13 | elegant rein orchid |
| C | *Sanicula crassicaulis* | 0.25 - 0.13 | Pacific sanicle |
| C | *Sedum spathulifolium* | 0.25 - 1.50 | broad-leaved stonecrop |
| C | *Stellaria media* | 0.25 - 0.13 | common chickweed |
| C | *Trifolium oliganthum* | 0.25 - 0.13 | few-flowered clover |
| C | *Vicia americana* | 0.25 - 1.50 | American vetch |
| D | *Dicranum scoparium* | 0.25 - 1.50 | broom-moss |
| D | *Pseudotsuga menziesii* | 0.25 - 0.13 | Douglas-fir |

| | | | Qgbm | | | |
|---|---|---|---|---|---|---|
| | | | Comm. types | | Phen | |
| | | | C11 | C45 | C51 | |
| | Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| **Trees** | | | | | | |
| | A | *Quercus garryana* | 0.57 - 13.33 | | 1.00 - 54.67 | Garry oak |
| **Shrubs** | | | | | | |
| | B1 | *Holodiscus discolor* | 0.29 - 11.50 | 0.20 - 3.60 | 0.67 - 14.67 | oceanspray |
| | B1 | *Quercus garryana* | 1.00 - 42.83 | 1.00 - 44.00 | 1.00 - 14.00 | Garry oak |
| | B2 | *Cytisus scoparius* | 0.57 - 0.33 | 0.20 - 0.10 | 1.00 - 4.17 | Scotch broom |
| | B2 | *Holodiscus discolor* | 0.14 - 0.08 | 0.60 - 17.40 | 0.33 - 2.00 | oceanspray |
| | B2 | *Mahonia aquifolium* | 0.43 - 2.08 | 0.60 - 4.90 | 0.33 - 0.17 | tall Oregon-grape |
| | B2 | *Paxistima myrsinites* | 0.14 - 0.08 | 0.60 - 2.50 | | falsebox |
| | B2 | *Quercus garryana* | 0.57 - 8.00 | 1.00 - 31.00 | 0.67 - 4.00 | Garry oak |
| | B2 | *Symphoricarpos albus* | 0.71 - 8.50 | 1.00 - 12.10 | 1.00 - 0.50 | common snowberry |
| **Herbs** | | | | | | |
| | C | *Aira praecox* | 0.86 - 7.25 | 0.40 - 1.30 | 0.33 - 0.17 | early hairgrass |
| | C | *Anthoxanthum odoratum* | 0.71 - 14.33 | 0.20 - 0.10 | 1.00 - 8.17 | sweet vernalgrass |
| | C | *Bromus carinatus* | 0.71 - 3.17 | 0.60 - 2.50 | 0.67 - 4.00 | California brome |
| | C | *Bromus hordeaceus* ssp. *hordeaceus* | 0.14 - 0.08 | 0.20 - 0.10 | 0.67 - 2.17 | soft brome |
| | C | *Bromus sterilis* | 0.29 - 0.17 | 0.40 - 4.80 | 0.67 - 2.17 | barren brome |
| | C | *Camassia leichtlinii* | 0.43 - 2.08 | 0.60 - 1.40 | 1.00 - 20.67 | great camas |
| | C | *Camassia quamash* | 0.57 - 3.08 | | | common camas |
| | C | *Cerastium arvense* | 0.29 - 1.08 | 0.60 - 0.30 | 0.67 - 2.17 | field chickweed |
| | C | *Claytonia perfoliata* | 0.71 - 14.33 | 0.20 - 0.10 | 1.00 - 14.83 | miner's-lettuce |
| | C | *Collinsia parviflora* | 0.29 - 1.08 | 0.20 - 0.10 | 0.67 - 0.33 | small-flowered blue-eyed Mary |
| | C | *Dactylis glomerata* | 0.57 - 3.08 | 0.20 - 0.10 | 0.67 - 8.00 | orchard-grass |
| | C | *Delphinium menziesii* | 0.29 - 1.08 | 0.40 - 0.20 | 0.67 - 2.17 | Menzies' larkspur |
| | C | *Elymus glaucus* | 1.00 - 11.17 | 0.60 - 1.40 | 0.67 - 2.17 | blue wildrye |
| | C | *Erythronium oregonum* | 0.43 - 3.17 | 0.40 - 0.20 | 0.67 - 2.17 | white fawn lily |
| | C | *Festuca roemerii* | 0.14 - 1.00 | 0.60 - 3.80 | 0.33 - 2.00 | Roemer's fescue |
| | C | *Galium aparine* | 1.00 - 11.17 | 0.80 - 3.70 | 1.00 - 14.00 | cleavers |
| | C | *Geranium molle* | 0.29 - 0.17 | 0.20 - 1.20 | 0.67 - 0.33 | dovefoot geranium |
| | C | *Heuchera micrantha* | 0.43 - 1.17 | 0.60 - 1.40 | 0.67 - 2.17 | small-flowered alumroot |
| | C | *Hypochaeris radicata* | 0.57 - 1.25 | 0.40 - 0.20 | 0.33 - 0.17 | hairy cat's-ear |
| | C | *Luzula comosa* var. *comosa* | 0.57 - 1.25 | 0.40 - 0.20 | | Pacific wood-rush |
| | C | *Melica subulata* | 0.29 - 4.00 | 0.60 - 7.30 | 0.67 - 6.17 | Alaska oniongrass |
| | C | *Montia parvifolia* | 1.00 - 28.50 | 0.20 - 1.20 | 0.67 - 4.00 | small-leaved montia |
| | C | *Osmorhiza berteroi* | 0.29 - 1.08 | | 1.00 - 2.33 | mountain sweet-cicely |
| | C | *Plectritis congesta* | 0.43 - 4.08 | 0.20 - 0.10 | 1.00 - 24.67 | sea blush |
| | C | *Poa pratensis* | 0.29 - 2.00 | 0.60 - 0.30 | 0.67 - 8.00 | Kentucky bluegrass |
| | C | *Polypodium glycyrrhiza* | 0.86 - 4.17 | 0.60 - 1.40 | 0.33 - 0.17 | licorice fern |
| | C | *Polystichum munitum* | 0.14 - 0.08 | | 0.67 - 0.33 | sword fern |
| | C | *Rubus ursinus* | | 0.20 - 0.10 | 1.00 - 2.33 | trailing blackberry |
| | C | *Rumex acetosella* | 0.57 - 4.17 | 0.40 - 0.20 | 0.33 - 0.17 | sheep sorrel |
| | C | *Sanicula crassicaulis* | 0.29 - 4.00 | 0.60 - 2.50 | 1.00 - 8.17 | Pacific sanicle |
| | C | *Sedum spathulifolium* | 0.43 - 4.08 | 1.00 - 22.00 | 1.00 - 6.33 | broad-leaved stonecrop |
| | C | *Stellaria media* | 0.29 - 0.17 | 0.20 - 0.10 | 0.67 - 0.33 | common chickweed |
| | C | *Vicia americana* | 0.14 - 0.08 | 0.20 - 1.20 | 0.67 - 2.17 | American vetch |
| | C | *Vicia hirsuta* | 0.29 - 2.00 | 0.40 - 1.30 | 0.67 - 0.33 | tiny vetch |
| | C | *Vicia sativa* | 0.29 - 1.08 | 0.20 - 0.10 | 0.67 - 2.17 | common vetch |
| | C | *Vulpia bromoides* | 0.57 - 3.25 | 0.60 - 4.90 | 0.67 - 4.00 | barren fescue |

Note: Presence > 0.60  0 5,  5.1 10,  10.1 25,  > 25

| | | Qgbm | | | |
|---|---|---|---|---|---|
| | | Comm. types | | Phen | |
| | | C11 | C45 | C51 | |
| Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| **Mosses and Lichens** | | | | | |
| D | *Dicranum scoparium* | 0.86 - 23.50 | 0.80 - 16.00 | 1.00 - 14.00 | broom-moss |
| D | *Eurhynchium oreganum* | 0.29 - 11.50 | 0.40 - 2.40 | 0.67 - 8.00 | Oregon beaked-moss |
| D | *Polytrichum juniperinum* | 0.57 - 6.00 | 0.40 - 2.40 | 0.33 - 2.00 | juniper haircap moss |
| D | *Quercus garryana* | 0.86 - 2.33 | 0.80 - 2.60 | 1.00 - 2.33 | Garry oak |
| D | *Rhytidiadelphus triquetrus* | 0.71 - 21.83 | 0.20 - 1.20 | 1.00 - 20.67 | electrified cat's-tail moss |
| **Additional species < 50% presence** | | | | | |
| A | *Arbutus menziesii* | 0.14 - 3.00 | | 0.33 - 2.00 | arbutus |
| A | *Pseudotsuga menziesii* | 0.43 - 5.00 | | | Douglas-fir |
| B1 | *Arbutus menziesii* | | 0.40 - 4.80 | 0.33 - 0.17 | arbutus |
| B1 | *Lonicera ciliosa* | | | 0.33 - 0.17 | western trumpet honeysuckle |
| B1 | *Pseudotsuga menziesii* | 0.14 - 1.00 | 0.20 - 1.20 | | Douglas-fir |
| B2 | *Amelanchier alnifolia* | 0.14 - 0.08 | 0.20 - 0.10 | | saskatoon |
| B2 | *Daphne laureola* | 0.14 - 0.08 | | 0.33 - 0.17 | spurge-laurel |
| B2 | *Lonicera ciliosa* | 0.14 - 0.08 | 0.20 - 1.20 | 0.33 - 0.17 | western trumpet honeysuckle |
| B2 | *Lonicera hispidula* | 0.14 - 3.00 | 0.40 - 4.80 | 0.33 - 0.17 | hairy honeysuckle |
| B2 | *Oemleria cerasiformis* | | 0.20 - 0.10 | | Indian-plum |
| B2 | *Pseudotsuga menziesii* | 0.14 - 0.08 | 0.20 - 1.20 | | Douglas-fir |
| B2 | *Rosa nutkana* | | | 0.33 - 2.00 | Nootka rose |
| C | *Aira caryophyllea* | 0.14 - 0.08 | 0.40 - 0.20 | | silver hairgrass |
| C | *Allium cernuum* | | 0.20 - 0.10 | | nodding onion |
| C | *Arrhenatherum elatius* | 0.14 - 0.08 | | 0.33 - 12.67 | tall oatgrass |
| C | *Brodiaea coronaria* | 0.29 - 1.08 | 0.20 - 0.10 | 0.33 - 2.00 | harvest brodiaea |
| C | *Carex inops* | 0.14 - 3.00 | 0.20 - 3.60 | | long-stoloned sedge |
| C | *Clarkia amoena* | | 0.20 - 0.10 | | farewell-to-spring |
| C | *Crepis* sp. | | 0.20 - 0.10 | 0.33 - 0.17 | |
| C | *Cynosurus echinatus* | 0.14 - 0.08 | 0.40 - 0.20 | | hedgehog dogtail |
| C | *Danthonia californica* | 0.14 - 0.08 | | | California oatgrass |
| C | *Dodecatheon hendersonii* | 0.14 - 1.00 | | | broad-leaved shootingstar |
| C | *Fritillaria affinis* | 0.14 - 0.08 | | | chocolate lily |
| C | *Holcus lanatus* | 0.14 - 0.08 | 0.20 - 0.10 | | common velvet-grass |
| C | *Lathyrus nevadensis* | 0.14 - 0.08 | 0.40 - 3.70 | 0.33 - 0.17 | purple peavine |
| C | *Lomatium triternatum* | | 0.20 - 0.10 | 0.33 - 2.00 | nine-leaved desert-parsley |
| C | *Lomatium utriculatum* | | 0.20 - 0.10 | 0.33 - 2.00 | spring gold |
| C | *Lotus micranthus* | | 0.40 - 0.20 | | small-flowered birds-foot trefoil |
| C | *Moehringia macrophylla* | 0.43 - 3.17 | | 0.33 - 0.17 | big-leaved sandwort |
| C | *Myosotis discolor* | 0.43 - 0.25 | 0.20 - 0.10 | | common forget-me-not |
| C | *Nemophila parviflora* | 0.29 - 1.08 | 0.40 - 0.20 | 0.33 - 2.00 | small-flowered nemophila |
| C | *Piperia elegans* | 0.14 - 0.08 | 0.20 - 0.10 | | elegant rein orchid |
| C | *Plantago lanceolata* | 0.14 - 0.08 | | | ribwort plantain |
| C | *Ranunculus occidentalis* | 0.14 - 1.00 | | | western buttercup |
| C | *Selaginella wallacei* | 0.43 - 0.25 | 0.40 - 4.80 | 0.33 - 0.17 | Wallace's selaginella |
| C | *Taraxacum officinale* | 0.14 - 0.08 | | | common dandelion |
| C | *Trifolium dubium* | | | 0.33 - 2.00 | small hop-clover |
| C | *Trifolium oliganthum* | | 0.20 - 0.10 | | few-flowered clover |
| C | *Veronica serpyllifolia* | 0.29 - 0.17 | 0.40 - 0.20 | 0.33 - 0.17 | thyme-leaved speedwell |
| D | *Pseudotsuga menziesii* | 0.29 - 0.17 | | | Douglas-fir |
| D | *Racomitrium canescens* | 0.14 - 1.00 | 0.40 - 2.40 | 0.33 - 2.00 | grey rock-moss |

| | | | Qghh | | |
|---|---|---|---|---|---|
| | | | Comm. types | | |
| | | | C16a | C26 | |
| | Layer | Scientific Name | Pres - Cover | Pres - Cover | Common Name |
| **Trees** | | | | | |
| | A | *Pseudotsuga menziesii* | 0.67 - 12.89 | 0.25 - 4.50 | Douglas-fir |
| | A | *Quercus garryana* | 0.56 - 32.22 | 0.75 - 36.00 | Garry oak |
| **Shrubs** | | | | | |
| | B1 | *Quercus garryana* | 0.67 - 23.67 | 0.75 - 26.75 | Garry oak |
| | B2 | *Cytisus scoparius* | 0.22 - 0.72 | 0.50 - 6.00 | Scotch broom |
| | B2 | *Lonicera hispidula* | 1.00 - 34.67 | | hairy honeysuckle |
| | B2 | *Mahonia aquifolium* | 0.22 - 1.33 | 1.00 - 28.00 | tall Oregon-grape |
| | B2 | *Quercus garryana* | 0.89 - 14.72 | 1.00 - 9.00 | Garry oak |
| | B2 | *Symphoricarpos albus* | 0.44 - 6.94 | 0.50 - 11.00 | common snowberry |
| **Herbs** | | | | | |
| | C | *Allium cernuum* | 0.11 - 0.06 | 0.50 - 0.25 | nodding onion |
| | C | *Brodiaea coronaria* | 0.67 - 2.89 | 0.25 - 0.13 | harvest brodiaea |
| | C | *Bromus carinatus* | 0.67 - 6.67 | 1.00 - 3.25 | California brome |
| | C | *Bromus hordeaceus* ssp. *hordeaceus* | 0.22 - 2.67 | 0.50 - 6.00 | soft brome |
| | C | *Bromus sterilis* | 0.67 - 5.72 | 1.00 - 10.63 | barren brome |
| | C | *Camassia leichtlinii* | 0.33 - 2.72 | 0.50 - 1.63 | great camas |
| | C | *Carex inops* | 0.33 - 3.33 | 0.50 - 4.63 | long-stoloned sedge |
| | C | *Cerastium arvense* | 0.56 - 3.44 | 0.75 - 7.50 | field chickweed |
| | C | *Cynosurus echinatus* | 0.44 - 2.78 | 0.75 - 11.13 | hedgehog dogtail |
| | C | *Dactylis glomerata* | 0.44 - 0.83 | 0.50 - 6.00 | orchard-grass |
| | C | *Elymus glaucus* | 0.89 - 9.61 | 1.00 - 10.63 | blue wildrye |
| | C | *Eriophyllum lanatum* | 0.11 - 0.06 | 0.50 - 1.63 | woolly eriophyllum |
| | C | *Festuca roemerii* | 0.33 - 1.39 | 0.50 - 0.25 | Roemer's fescue |
| | C | *Galium aparine* | 0.89 - 10.06 | 0.75 - 6.13 | cleavers |
| | C | *Osmorhiza berteroi* | 0.56 - 3.33 | 0.25 - 0.13 | mountain sweet-cicely |
| | C | *Plantago lanceolata* | 0.33 - 2.00 | 0.50 - 0.25 | ribwort plantain |
| | C | *Poa pratensis* | 0.56 - 2.83 | 0.50 - 3.00 | Kentucky bluegrass |
| | C | *Sanicula crassicaulis* | 0.89 - 4.22 | 0.75 - 9.13 | Pacific sanicle |
| | C | *Sedum spathulifolium* | 0.11 - 0.67 | 0.50 - 0.25 | broad-leaved stonecrop |
| | C | *Vicia hirsuta* | 0.78 - 4.78 | 0.50 - 6.00 | tiny vetch |
| | C | *Vicia sativa* | 0.89 - 10.94 | 1.00 - 4.63 | common vetch |
| | C | *Vulpia bromoides* | 0.33 - 3.33 | 0.50 - 6.00 | barren fescue |
| **Mosses and Lichens** | | | | | |
| | D | *Quercus garryana* | 0.78 - 3.56 | 1.00 - 3.25 | Garry oak |
| | D | *Racomitrium canescens* | 0.11 - 0.67 | 0.50 - 3.00 | grey rock-moss |
| **Additional species < 50% presence** | | | | | |
| | B1 | *Arbutus menziesii* | 0.22 - 1.33 | | arbutus |
| | B1 | *Cytisus scoparius* | 0.11 - 4.22 | | Scotch broom |
| | B1 | *Holodiscus discolor* | 0.33 - 1.39 | 0.25 - 4.50 | oceanspray |
| | B1 | *Lonicera hispidula* | 0.11 - 0.06 | | hairy honeysuckle |
| | B1 | *Pseudotsuga menziesii* | | 0.25 - 1.50 | Douglas-fir |
| | B2 | *Amelanchier alnifolia* | 0.22 - 0.72 | 0.25 - 0.13 | saskatoon |
| | B2 | *Arbutus menziesii* | 0.22 - 0.72 | | arbutus |
| | B2 | *Holodiscus discolor* | 0.33 - 3.33 | | oceanspray |
| | B2 | *Lonicera ciliosa* | | 0.25 - 0.13 | western trumpet honeysuckle |
| | B2 | *Pseudotsuga menziesii* | 0.11 - 2.00 | 0.25 - 4.50 | Douglas-fir |
| | B2 | *Rosa nutkana* | 0.11 - 0.67 | 0.25 - 1.50 | Nootka rose |
| | C | *Aira caryophyllea* | 0.11 - 0.06 | | silver hairgrass |
| | C | *Aira praecox* | 0.11 - 0.67 | | early hairgrass |

Note: Presence > 0.60 0- 5, 5.1- 10, 10.1- 25, > 25

| | | Qghh | | |
|---|---|---|---|---|
| | | Comm. types | | |
| | | C16a | C26 | |
| Layer | Scientific Name | Pres - Cover | Pres - Cover | Common Name |
| C | *Anthoxanthum odoratum* | 0.33 - 4.33 | 0.25 - 1.50 | sweet vernalgrass |
| C | *Bromus rigidus* | 0.22 - 2.06 | | rip-gut brome |
| C | *Camassia quamash* | 0.22 - 2.06 | | common camas |
| C | *Claytonia perfoliata* | 0.22 - 0.72 | 0.25 - 0.13 | miner's-lettuce |
| C | *Clinopodium douglasii* | 0.22 - 6.22 | 0.25 - 1.50 | yerba buena |
| C | *Collinsia parviflora* | 0.11 - 0.06 | | small-flowered blue-eyed Mary |
| C | *Crepis* sp. | 0.33 - 0.17 | | |
| C | *Danthonia californica* | 0.22 - 1.33 | 0.25 - 1.50 | California oatgrass |
| C | *Delphinium menziesii* | | 0.25 - 0.13 | Menzies' larkspur |
| C | *Dodecatheon hendersonii* | | 0.25 - 0.13 | broad-leaved shootingstar |
| C | *Erythronium oregonum* | 0.11 - 0.06 | | white fawn lily |
| C | *Fritillaria affinis* | 0.22 - 0.72 | 0.25 - 0.13 | chocolate lily |
| C | *Galium aparine* | 0.11 - 0.67 | 0.25 - 0.13 | cleavers |
| C | *Geranium molle* | 0.33 - 1.39 | 0.25 - 1.50 | dovefoot geranium |
| C | *Holcus lanatus* | 0.22 - 0.72 | | common velvet-grass |
| C | *Hypochaeris radicata* | 0.33 - 0.17 | 0.25 - 4.50 | hairy cat's-ear |
| C | *Koeleria macrantha* | 0.11 - 2.00 | 0.25 - 0.13 | junegrass |
| C | *Lomatium nudicaule* | | 0.25 - 0.13 | barestem desert-parsley |
| C | *Lomatium triternatum* | | 0.25 - 0.13 | nine-leaved desert-parsley |
| C | *Lomatium utriculatum* | 0.11 - 0.06 | | spring gold |
| C | *Lotus micranthus* | 0.11 - 0.67 | 0.25 - 0.13 | small-flowered birds-foot trefoil |
| C | *Luzula comosa* var. *comosa* | 0.33 - 2.11 | 0.25 - 0.13 | Pacific wood-rush |
| C | *Melica subulata* | 0.44 - 2.78 | 0.25 - 4.50 | Alaska oniongrass |
| C | *Moehringia macrophylla* | 0.11 - 0.06 | | big-leaved sandwort |
| C | *Myosotis discolor* | 0.33 - 0.78 | 0.25 - 0.13 | common forget-me-not |
| C | *Nemophila parviflora* | 0.44 - 1.44 | 0.25 - 0.13 | small-flowered nemophila |
| C | *Pentagramma triangularis* | 0.11 - 0.06 | | goldenback fern |
| C | *Plectritis congesta* | 0.11 - 0.06 | | sea blush |
| C | *Ranunculus occidentalis* | 0.33 - 0.78 | 0.25 - 0.13 | western buttercup |
| C | *Rubus ursinus* | 0.11 - 2.00 | | trailing blackberry |
| C | *Rumex acetosella* | 0.22 - 0.11 | 0.25 - 1.50 | sheep sorrel |
| C | *Selaginella wallacei* | 0.44 - 0.83 | 0.25 - 1.50 | Wallace's selaginella |
| C | *Stellaria media* | 0.33 - 0.78 | | common chickweed |
| C | *Taraxacum officinale* | 0.22 - 0.11 | | common dandelion |
| C | *Trifolium dubium* | 0.11 - 0.06 | 0.25 - 0.13 | small hop-clover |
| C | *Trifolium microcephalum* | 0.22 - 2.67 | | small-headed clover |
| C | *Trifolium oliganthum* | 0.11 - 0.06 | | few-flowered clover |
| C | *Veronica serpyllifolia* | 0.11 - 0.06 | | thyme-leaved speedwell |
| C | *Vicia americana* | 0.33 - 1.39 | 0.25 - 1.50 | American vetch |
| D | *Dicranum scoparium* | 0.33 - 2.00 | 0.25 - 1.50 | broom-moss |
| D | *Eurhynchium oreganum* | 0.11 - 0.67 | 0.25 - 1.50 | Oregon beaked-moss |
| D | *Pseudotsuga menziesii* | 0.11 - 0.06 | | Douglas-fir |
| D | *Rhytidiadelphus triquetrus* | | 0.25 - 1.50 | electrified cat's-tail moss |

| | | | Qgrf | | | | |
|---|---|---|---|---|---|---|---|
| | | | Comm. types | | | | |
| | | | C20 | C25 | C27 | C42 | |
| | Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| **Trees** | | | | | | | |
| | A | *Pseudotsuga menziesii* | 0.43 - 8.86 | 0.17 - 3.00 | 0.50 - 3.00 | 0.33 - 2.00 | Douglas-fir |
| | A | *Quercus garryana* | 0.71 - 48.57 | 0.50 - 17.83 | 1.00 - 56.75 | 0.50 - 24.00 | Garry oak |
| **Shrubs** | | | | | | | |
| | B1 | *Quercus garryana* | 0.86 - 16.00 | 0.83 - 47.17 | 0.25 - 1.50 | 0.67 - 19.50 | Garry oak |
| | B2 | *Amelanchier alnifolia* | 0.29 - 0.93 | | | 0.50 - 6.08 | saskatoon |
| | B2 | *Cytisus scoparius* | 0.14 - 0.07 | 0.67 - 8.00 | 0.25 - 4.50 | 0.17 - 1.00 | Scotch broom |
| | B2 | *Lonicera hispidula* | 0.71 - 13.57 | 0.50 - 5.00 | 0.50 - 6.00 | 0.67 - 6.17 | hairy honeysuckle |
| | B2 | *Mahonia aquifolium* | 0.14 - 0.86 | 0.33 - 1.08 | 0.25 - 0.13 | 0.67 - 2.17 | tall Oregon-grape |
| | B2 | *Pseudotsuga menziesii* | 0.14 - 0.86 | 0.17 - 3.00 | 0.50 - 3.00 | 0.17 - 1.00 | Douglas-fir |
| | B2 | *Quercus garryana* | 0.86 - 13.14 | 0.67 - 3.08 | 0.50 - 1.63 | 1.00 - 54.33 | Garry oak |
| | B2 | *Symphoricarpos albus* | 0.43 - 1.00 | 0.50 - 2.08 | | 0.83 - 10.50 | common snowberry |
| **Herbs** | | | | | | | |
| | C | *Aira caryophyllea* | 0.14 - 0.86 | 0.33 - 0.17 | 0.75 - 3.13 | 0.33 - 1.08 | silver hairgrass |
| | C | *Aira praecox* | 0.43 - 3.50 | 0.17 - 0.08 | 0.25 - 0.13 | 0.50 - 0.25 | early hairgrass |
| | C | *Anthoxanthum odoratum* | 0.43 - 1.79 | 0.83 - 11.42 | 0.50 - 6.00 | 0.50 - 7.42 | sweet vernalgrass |
| | C | *Brodiaea coronaria* | 0.57 - 1.07 | 0.50 - 1.17 | 0.25 - 0.13 | 0.67 - 1.25 | harvest brodiaea |
| | C | *Bromus carinatus* | 0.71 - 7.71 | 0.83 - 11.00 | 0.75 - 0.38 | 0.83 - 8.08 | California brome |
| | C | *Bromus hordeaceus* ssp. *hordeaceus* | 0.43 - 1.79 | 0.50 - 2.08 | 0.50 - 0.25 | 0.50 - 1.17 | soft brome |
| | C | *Bromus rigidus* | | 0.50 - 2.08 | 0.25 - 1.50 | 0.17 - 0.08 | rip-gut brome |
| | C | *Bromus sterilis* | 0.43 - 2.57 | 0.17 - 1.00 | 0.75 - 20.50 | 0.67 - 4.17 | barren brome |
| | C | *Camassia leichtlinii* | 0.14 - 2.57 | 0.17 - 3.00 | | 0.83 - 3.17 | great camas |
| | C | *Camassia quamash* | 0.43 - 3.50 | 0.50 - 2.08 | 0.25 - 0.13 | 0.17 - 1.00 | common camas |
| | C | *Carex inops* | 0.29 - 1.71 | 0.50 - 5.00 | 0.75 - 18.50 | 0.17 - 0.08 | long-stoloned sedge |
| | C | *Cerastium arvense* | 0.86 - 3.57 | 1.00 - 21.33 | 1.00 - 6.25 | 1.00 - 2.33 | field chickweed |
| | C | *Claytonia perfoliata* | 0.14 - 0.86 | 0.50 - 1.17 | 0.25 - 0.13 | 0.33 - 1.08 | miner's-lettuce |
| | C | *Clinopodium douglasii* | 0.14 - 0.07 | 0.17 - 0.08 | | 0.50 - 9.42 | yerba buena |
| | C | *Cynosurus echinatus* | 0.43 - 8.07 | 0.33 - 1.08 | 0.25 - 9.50 | 0.50 - 4.08 | hedgehog dogtail |
| | C | *Dactylis glomerata* | 0.43 - 3.50 | 0.33 - 0.17 | 0.25 - 0.13 | 0.50 - 19.83 | orchard-grass |
| | C | *Elymus glaucus* | 0.86 - 11.21 | 0.83 - 10.08 | 1.00 - 1.88 | 0.67 - 10.00 | blue wildrye |
| | C | *Erythronium oregonum* | | | | 0.50 - 0.25 | white fawn lily |
| | C | *Festuca roemerii* | 1.00 - 26.57 | 1.00 - 17.33 | 0.75 - 23.50 | 0.83 - 10.08 | Roemer's fescue |
| | C | *Fritillaria affinis* | 0.29 - 0.14 | 0.50 - 0.25 | | 0.50 - 1.17 | chocolate lily |
| | C | *Galium aparine* | 0.86 - 7.00 | 0.83 - 6.25 | 0.75 - 6.13 | 1.00 - 8.17 | cleavers |
| | C | *Geranium molle* | 0.14 - 0.07 | 0.17 - 0.08 | 0.50 - 3.00 | | dovefoot geranium |
| | C | *Heuchera micrantha* | 0.14 - 0.07 | | | 0.50 - 0.25 | small-flowered alumroot |
| | C | *Holcus lanatus* | 0.29 - 0.14 | 0.50 - 1.17 | | 0.17 - 0.08 | common velvet-grass |
| | C | *Hypochaeris radicata* | 0.71 - 0.36 | 0.33 - 0.17 | 0.75 - 6.13 | 0.50 - 0.25 | hairy cat's-ear |
| | C | *Lomatium utriculatum* | 0.29 - 0.14 | 0.67 - 2.17 | 0.25 - 0.13 | 0.17 - 1.00 | spring gold |
| | C | *Lotus micranthus* | 0.14 - 2.57 | 0.33 - 3.08 | 0.50 - 3.00 | 0.17 - 0.08 | small-flowered birds-foot trefoil |
| | C | *Luzula comosa* var. *comosa* | 0.57 - 3.57 | 0.33 - 1.08 | 0.50 - 3.00 | 0.50 - 1.17 | Pacific wood-rush |
| | C | *Melica subulata* | 0.29 - 0.93 | 0.17 - 0.08 | 0.25 - 1.50 | 0.50 - 1.17 | Alaska oniongrass |
| | C | *Myosotis discolor* | 0.14 - 0.07 | 0.17 - 0.08 | 0.50 - 3.00 | | common forget-me-not |
| | C | *Pentagramma triangularis* | 0.14 - 0.07 | 0.17 - 0.08 | 0.50 - 0.25 | | goldenback fern |
| | C | *Plantago lanceolata* | 0.57 - 1.86 | 0.50 - 4.08 | | 0.67 - 1.25 | ribwort plantain |
| | C | *Poa pratensis* | 0.71 - 9.43 | 0.50 - 7.00 | 0.50 - 3.00 | 0.83 - 7.17 | Kentucky bluegrass |
| | C | *Ranunculus occidentalis* | 0.43 - 1.00 | 0.50 - 2.08 | 0.25 - 4.50 | 0.33 - 1.08 | western buttercup |
| | C | *Rumex acetosella* | 0.57 - 1.86 | 0.83 - 0.42 | 0.75 - 1.75 | 0.33 - 0.17 | sheep sorrel |
| | C | *Sanicula crassicaulis* | 1.00 - 10.50 | 0.33 - 4.00 | 0.50 - 3.00 | 0.83 - 6.08 | Pacific sanicle |
| | C | *Selaginella wallacei* | 0.29 - 0.93 | 0.33 - 3.08 | 1.00 - 6.25 | 0.17 - 0.08 | Wallace's selaginella |

Note: Presence > 0.60  0 5,  5.1 10,  10.1 25,  > 25

| | | Qgrf | | | | |
|---|---|---|---|---|---|---|
| | | Comm. types | | | | |
| | | C20 | C25 | C27 | C42 | |
| Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| C | *Trifolium dubium* | 0.43 - 0.21 | 0.33 - 1.08 | 0.25 - 0.13 | 0.50 - 0.25 | small hop-clover |
| C | *Trifolium microcephalum* | 0.14 - 0.07 | | 1.00 - 23.00 | | small-headed clover |
| C | *Trifolium oliganthum* | 0.14 - 0.07 | 0.17 - 0.08 | 0.75 - 1.75 | | few-flowered clover |
| C | *Veronica serpyllifolia* | 0.29 - 0.14 | 0.17 - 0.08 | 0.50 - 0.25 | | thyme-leaved speedwell |
| C | *Vicia americana* | 0.29 - 5.50 | 0.17 - 3.00 | | 1.00 - 15.33 | American vetch |
| C | *Vicia hirsuta* | 0.43 - 2.71 | 0.50 - 5.00 | | 0.17 - 3.00 | tiny vetch |
| C | *Vicia sativa* | 0.57 - 5.29 | 0.83 - 6.08 | 0.50 - 1.63 | 1.00 - 7.08 | common vetch |
| C | *Vulpia bromoides* | 0.43 - 6.36 | 0.50 - 2.08 | 0.50 - 1.63 | 0.50 - 2.08 | barren fescue |
| **Mosses and Lichens** | | | | | | |
| D | *Dicranum scoparium* | 0.43 - 6.00 | 0.50 - 5.00 | 0.50 - 3.00 | | broom-moss |
| D | *Eurhynchium oreganum* | 0.14 - 0.86 | | | 0.50 - 3.00 | Oregon beaked-moss |
| D | *Pseudotsuga menziesii* | 0.29 - 0.14 | 0.17 - 0.08 | 0.75 - 0.38 | 0.17 - 0.08 | Douglas-fir |
| D | *Quercus garryana* | 0.86 - 3.71 | 0.50 - 1.17 | 0.50 - 0.25 | 0.83 - 11.42 | Garry oak |
| D | *Racomitrium canescens* | 0.14 - 2.57 | 0.17 - 1.00 | 0.75 - 7.50 | 0.17 - 1.00 | grey rock-moss |
| **Additional species < 50% presence** | | | | | | |
| A | *Arbutus menziesii* | 0.14 - 0.86 | | | 0.17 - 3.00 | arbutus |
| B1 | *Amelanchier alnifolia* | 0.14 - 0.86 | | | | saskatoon |
| B1 | *Arbutus menziesii* | 0.14 - 2.57 | | | | arbutus |
| B1 | *Cytisus scoparius* | | 0.17 - 1.00 | | | Scotch broom |
| B1 | *Holodiscus discolor* | 0.14 - 2.57 | | | 0.33 - 6.00 | oceanspray |
| B1 | *Pseudotsuga menziesii* | 0.14 - 0.86 | | | 0.17 - 1.00 | Douglas-fir |
| B2 | *Arbutus menziesii* | | 0.17 - 0.08 | | | arbutus |
| B2 | *Holodiscus discolor* | 0.14 - 0.07 | 0.17 - 1.00 | | 0.33 - 1.08 | oceanspray |
| B2 | *Lonicera ciliosa* | | | | 0.33 - 0.17 | western trumpet honeysuckle |
| B2 | *Paxistima myrsinites* | 0.14 - 0.07 | | | 0.33 - 2.00 | falsebox |
| B2 | *Rosa nutkana* | 0.14 - 0.07 | | | 0.33 - 1.08 | Nootka rose |
| C | *Allium cernuum* | 0.14 - 0.07 | 0.33 - 0.17 | 0.25 - 0.13 | 0.17 - 0.08 | nodding onion |
| C | *Bromus tectorum* | | 0.17 - 0.08 | | | cheatgrass |
| C | *Clarkia amoena* | | | 0.25 - 0.13 | 0.17 - 0.08 | farewell-to-spring |
| C | *Collinsia parviflora* | 0.14 - 0.07 | 0.33 - 0.17 | 0.25 - 0.13 | | small-flowered blue-eyed Mary |
| C | *Crepis* sp. | 0.14 - 0.07 | 0.17 - 0.08 | 0.25 - 0.13 | | |
| C | *Danthonia californica* | 0.14 - 0.07 | 0.17 - 1.00 | 0.25 - 0.13 | 0.17 - 0.08 | California oatgrass |
| C | *Delphinium menziesii* | | 0.33 - 0.17 | | 0.17 - 0.08 | Menzies' larkspur |
| C | *Dodecatheon hendersonii* | 0.29 - 2.64 | 0.33 - 4.00 | | | broad-leaved shootingstar |
| C | *Eriophyllum lanatum* | | 0.33 - 1.08 | 0.25 - 0.13 | | woolly eriophyllum |
| C | *Galium aparine* | | 0.33 - 1.08 | 0.25 - 0.13 | 0.17 - 1.00 | cleavers |
| C | *Koeleria macrantha* | | 0.17 - 1.00 | 0.25 - 1.50 | 0.17 - 0.08 | junegrass |
| C | *Lathyrus nevadensis* | 0.29 - 0.14 | | | | purple peavine |
| C | *Lomatium nudicaule* | | 0.17 - 1.00 | | 0.17 - 0.08 | barestem desert-parsley |
| C | *Lomatium triternatum* | | | 0.25 - 0.13 | | nine-leaved desert-parsley |
| C | *Moehringia macrophylla* | 0.14 - 0.07 | | | | big-leaved sandwort |
| C | *Nemophila parviflora* | 0.14 - 0.86 | 0.33 - 1.08 | | | small-flowered nemophila |
| C | *Osmorhiza berteroi* | 0.43 - 1.00 | 0.17 - 0.08 | | 0.17 - 0.08 | mountain sweet-cicely |
| C | *Piperia elegans* | 0.14 - 0.07 | 0.17 - 0.08 | | 0.17 - 0.08 | elegant rein orchid |
| C | *Plectritis congesta* | 0.29 - 0.93 | 0.17 - 0.08 | | 0.17 - 0.08 | sea blush |
| C | *Polypodium glycyrrhiza* | 0.14 - 0.07 | 0.17 - 1.00 | | | licorice fern |
| C | *Polystichum munitum* | 0.14 - 0.07 | | | | sword fern |
| C | *Rubus ursinus* | 0.29 - 0.14 | | | | trailing blackberry |
| C | *Sedum spathulifolium* | 0.29 - 1.71 | 0.17 - 0.08 | 0.25 - 0.13 | 0.33 - 3.08 | broad-leaved stonecrop |
| C | *Stellaria media* | 0.29 - 0.14 | 0.33 - 0.17 | 0.25 - 0.13 | 0.17 - 0.08 | common chickweed |

| | | Qgrf | | | | |
|---|---|---|---|---|---|---|
| | | Comm. types | | | | |
| | | C20 | C25 | C27 | C42 | |
| Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| C | *Taraxacum officinale* | 0.14 - 0.07 | | 0.25 - 0.13 | | common dandelion |
| D | *Arbutus menziesii* | 0.43 - 0.21 | | 0.25 - 0.13 | | arbutus |
| D | *Polytrichum juniperinum* | 0.29 - 1.71 | 0.17 - 1.00 | | | juniper haircap moss |
| D | *Rhytidiadelphus triquetrus* | | 0.17 - 1.00 | | 0.33 - 4.00 | electrified cat's-tail moss |

| | | Qgcc | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Comm. types | | Phen. types | | | | |
| | | C47, in part | C14 | C37a | C35a | C35b | C37b | |
| Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| **Trees** | | | | | | | | |
| A | *Pseudotsuga menziesii* | 0.29 - 8.00 | 0.33 - 4.00 | 0.25 - 4.17 | 0.40 - 2.40 | 0.75 - 4.50 | | Douglas-fir |
| A | *Quercus garryana* | 0.71 - 40.00 | 0.83 - 52.50 | 0.83 - 48.33 | 0.60 - 31.40 | 0.75 - 10.50 | 0.83 - 48.33 | Garry oak |
| **Shrubs** | | | | | | | | |
| B1 | *Arbutus menziesii* | 0.07 - 0.43 | 0.67 - 6.00 | 0.17 - 1.00 | 0.20 - 1.20 | 0.50 - 6.00 | | arbutus |
| B1 | *Quercus garryana* | 0.71 - 32.36 | 0.50 - 12.33 | 0.83 - 21.42 | 0.80 - 29.00 | 1.00 - 12.00 | 0.50 - 13.67 | Garry oak |
| B2 | *Cytisus scoparius* | 0.57 - 3.04 | 0.17 - 0.08 | 0.58 - 14.29 | 0.40 - 0.20 | 0.75 - 16.00 | | Scotch broom |
| B2 | *Mahonia aquifolium* | 0.36 - 2.21 | 0.50 - 1.17 | 0.58 - 4.04 | 0.80 - 2.60 | 0.75 - 0.38 | 0.17 - 1.00 | tall Oregon-grape |
| B2 | *Quercus garryana* | 0.64 - 6.89 | 0.33 - 9.33 | 0.75 - 5.04 | 0.60 - 12.40 | 0.25 - 1.50 | 0.83 - 3.17 | Garry oak |
| B2 | *Symphoricarpos albus* | 0.64 - 16.75 | 0.50 - 9.42 | 0.75 - 12.08 | 1.00 - 21.20 | 0.75 - 6.13 | 0.67 - 6.00 | common snowberry |
| **Herbs** | | | | | | | | |
| C | *Aira praecox* | 0.07 - 0.04 | 0.33 - 1.08 | 0.25 - 0.13 | 0.20 - 0.10 | 0.50 - 1.63 | 0.33 - 2.00 | early hairgrass |
| C | *Anthoxanthum odoratum* | 0.29 - 0.93 | 0.50 - 5.00 | 0.58 - 7.25 | 0.40 - 4.80 | 0.50 - 0.25 | 0.67 - 3.25 | sweet vernalgrass |
| C | *Brodiaea coronaria* | 0.29 - 2.64 | 0.67 - 5.08 | 0.58 - 7.71 | 0.60 - 4.90 | 0.75 - 0.38 | 0.33 - 1.08 | harvest brodiaea |
| C | *Bromus carinatus* | 0.57 - 1.07 | 0.33 - 4.00 | 0.58 - 2.21 | 0.40 - 1.30 | 0.75 - 1.75 | 0.67 - 5.08 | California brome |
| C | *Bromus hordeaceus* ssp. *hordeaceus* | 0.50 - 0.64 | | 0.25 - 1.58 | | | 0.33 - 2.00 | soft brome |
| C | *Bromus sterilis* | 0.64 - 5.43 | 0.50 - 1.17 | 0.33 - 2.08 | | 0.25 - 0.13 | 0.67 - 10.42 | barren brome |
| C | *Camassia leichtlinii* | 0.50 - 6.04 | 0.17 - 1.00 | 0.17 - 1.00 | 0.20 - 3.60 | | 0.17 - 1.00 | great camas |
| C | *Camassia quamash* | 0.14 - 1.71 | 0.67 - 8.00 | 1.00 - 22.42 | 1.00 - 22.20 | 1.00 - 10.63 | 1.00 - 23.08 | common camas |
| C | *Carex inops* | 0.71 - 10.64 | 1.00 - 43.00 | 0.58 - 9.33 | 0.60 - 4.90 | 0.75 - 6.13 | 0.33 - 6.00 | long-stoloned sedge |
| C | *Cerastium arvense* | 0.64 - 5.64 | 0.50 - 5.00 | 0.25 - 0.13 | 0.20 - 1.20 | 0.50 - 1.63 | 0.33 - 3.08 | field chickweed |
| C | *Claytonia perfoliata* | 0.36 - 1.36 | | 0.50 - 2.63 | | 0.25 - 0.13 | 0.33 - 1.08 | miner's-lettuce |
| C | *Clinopodium douglasii* | 0.07 - 1.29 | 0.33 - 1.08 | 0.17 - 0.54 | 0.20 - 0.10 | 0.50 - 1.63 | | yerba buena |
| C | *Collinsia parviflora* | | 0.33 - 2.00 | 0.25 - 0.13 | | 0.75 - 1.75 | 0.33 - 1.08 | small-flowered blue-eyed Mary |
| C | *Cynosurus echinatus* | 0.64 - 3.61 | 0.50 - 9.42 | 0.25 - 1.58 | | | 0.17 - 0.08 | hedgehog dogtail |
| C | *Dactylis glomerata* | 0.21 - 1.29 | 0.33 - 2.00 | 0.42 - 6.25 | 0.80 - 6.10 | 0.50 - 0.25 | 0.83 - 6.08 | orchard-grass |
| C | *Danthonia californica* | 0.29 - 5.00 | 0.83 - 2.25 | 0.25 - 0.58 | 0.20 - 0.10 | | | California oatgrass |
| C | *Dodecatheon hendersonii* | 0.29 - 0.14 | | 0.42 - 1.13 | 0.20 - 0.10 | 1.00 - 18.00 | 0.33 - 0.17 | broad-leaved shootingstar |
| C | *Elymus glaucus* | 1.00 - 28.57 | 0.83 - 5.00 | 0.67 - 5.08 | 0.40 - 1.30 | 1.00 - 4.63 | 0.50 - 1.17 | blue wildrye |
| C | *Erythronium oregonum* | 0.21 - 0.11 | 0.33 - 3.08 | 0.33 - 1.08 | 1.00 - 28.60 | 0.50 - 4.63 | 0.50 - 2.08 | white fawn lily |
| C | *Festuca roemerii* | 0.43 - 1.39 | 0.67 - 2.17 | 0.50 - 1.17 | 0.20 - 0.10 | 0.50 - 11.00 | 0.17 - 0.08 | Roemer's fescue |
| C | *Fritillaria affinis* | 0.14 - 0.07 | 0.50 - 3.17 | 0.25 - 0.13 | 0.40 - 3.70 | 0.50 - 0.25 | 0.50 - 1.17 | chocolate lily |
| C | *Galium aparine* | 0.93 - 9.14 | 0.83 - 7.00 | 0.92 - 3.75 | 0.60 - 2.50 | 1.00 - 3.25 | 0.67 - 4.17 | cleavers |
| C | *Geranium molle* | 0.29 - 1.39 | 0.33 - 0.17 | 0.42 - 3.04 | | | 0.50 - 2.08 | dovefoot geranium |
| C | *Hypochaeris radicata* | 0.14 - 0.07 | 0.67 - 0.33 | 0.58 - 1.21 | 0.60 - 0.30 | 0.25 - 0.13 | 0.50 - 2.08 | hairy cat's-ear |
| C | *Lathyrus nevadensis* | 0.21 - 0.89 | 0.17 - 3.00 | 0.08 - 0.50 | 0.40 - 3.70 | 0.25 - 1.50 | 0.50 - 6.08 | purple peavine |
| C | *Lomatium utriculatum* | 0.29 - 1.39 | 0.67 - 4.17 | 0.50 - 1.17 | 0.20 - 0.10 | 0.75 - 1.75 | 0.50 - 3.00 | spring gold |
| C | *Lotus micranthus* | 0.14 - 0.46 | 0.67 - 3.08 | 0.25 - 0.58 | | 0.25 - 0.13 | 0.17 - 1.00 | small-flowered birds-foot trefoil |
| C | *Luzula comosa* var. *comosa* | 0.14 - 0.46 | 0.50 - 1.17 | 0.25 - 0.58 | 0.40 - 0.20 | 0.75 - 1.75 | 0.17 - 1.00 | Pacific wood-rush |
| C | *Melica subulata* | 0.57 - 6.46 | 0.50 - 2.08 | 0.33 - 6.83 | 0.20 - 0.10 | | 0.17 - 0.08 | Alaska oniongrass |
| C | *Nemophila parviflora* | 0.50 - 1.82 | | 0.25 - 0.58 | 0.20 - 0.10 | 0.50 - 0.25 | | small-flowered nemophila |
| C | *Piperia elegans* | 0.07 - 0.43 | 0.17 - 0.08 | 0.08 - 0.04 | | 0.50 - 0.25 | | elegant rein orchid |
| C | *Plantago lanceolata* | 0.14 - 0.07 | 0.67 - 0.33 | 0.50 - 0.25 | 0.60 - 1.40 | 0.25 - 0.13 | 0.67 - 1.25 | ribwort plantain |
| C | *Plectritis congesta* | 0.36 - 0.57 | 0.17 - 1.00 | 0.33 - 1.08 | 0.20 - 0.10 | 0.75 - 1.75 | 0.17 - 1.00 | sea blush |
| C | *Poa pratensis* | 0.64 - 7.07 | 0.50 - 4.08 | 0.67 - 7.08 | 0.60 - 6.00 | 0.25 - 0.13 | 1.00 - 9.50 | Kentucky bluegrass |
| C | *Ranunculus occidentalis* | 0.43 - 1.00 | 0.83 - 4.08 | 0.17 - 0.08 | 0.40 - 1.30 | | 1.00 - 21.33 | western buttercup |

Note: Presence ≥ 0.60 0–5, 5.1–10, 10.1–25, > 25

| | | Qgcc | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Comm. types | | Phen. types | | | | |
| | | C47, in part | C14 | C37a | C35a | C35b | C37b | |
| Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| C | *Rhinanthus minor* | | | 0.33 - 1.08 | | 0.50 - 3.00 | | yellow rattle |
| C | *Rumex acetosella* | 0.43 - 0.21 | 0.83 - 1.33 | 0.58 - 1.67 | 0.20 - 1.20 | 0.75 - 0.38 | 0.33 - 0.17 | sheep sorrel |
| C | *Sanicula crassicaulis* | 0.93 - 6.50 | 0.67 - 4.00 | 1.00 - 10.54 | 0.40 - 1.30 | 0.75 - 1.75 | 0.50 - 5.00 | Pacific sanicle |
| C | *Stellaria media* | 0.36 - 1.43 | 0.33 - 0.17 | 0.67 - 3.17 | 0.60 - 0.30 | 1.00 - 0.50 | 0.83 - 3.17 | common chickweed |
| C | *Taraxacum officinale* | | | 0.33 - 0.17 | 0.60 - 1.40 | | 0.50 - 0.25 | common dandelion |
| C | *Trifolium oliganthum* | 0.21 - 0.11 | 0.33 - 1.08 | 0.08 - 0.04 | | 0.75 - 0.38 | 0.17 - 0.08 | few-flowered clover |
| C | *Vicia hirsuta* | 0.36 - 4.89 | 0.83 - 6.25 | 0.58 - 5.58 | 0.40 - 1.30 | 0.50 - 0.25 | 0.50 - 4.08 | tiny vetch |
| C | *Vicia sativa* | 0.64 - 4.39 | 1.00 - 3.25 | 0.67 - 3.63 | 0.60 - 2.50 | | 1.00 - 6.17 | common vetch |
| C | *Vulpia bromoides* | 0.50 - 1.43 | | 0.25 - 2.04 | | | 0.17 - 1.00 | barren fescue |
| **Mosses and Lichens** | | | | | | | | |
| D | *Dicranum scoparium* | 0.07 - 0.43 | 0.67 - 6.00 | 0.25 - 1.04 | 0.40 - 4.80 | 0.75 - 4.50 | 0.17 - 3.00 | broom-moss |
| D | *Polytrichum juniperinum* | | | 0.08 - 0.50 | 0.20 - 1.20 | 1.00 - 4.63 | | juniper haircap moss |
| D | *Quercus garryana* | 0.79 - 2.82 | 0.67 - 1.25 | 0.58 - 0.75 | 0.60 - 1.40 | 1.00 - 1.88 | | Garry oak |
| D | *Racomitrium canescens* | 0.14 - 0.86 | 0.50 - 3.00 | 0.17 - 2.00 | 0.20 - 1.20 | 1.00 - 15.63 | 0.17 - 1.00 | grey rock-moss |
| D | *Rhytidiadelphus triquetrus* | 0.21 - 2.14 | 0.17 - 1.00 | 0.25 - 4.17 | 0.20 - 7.60 | 0.50 - 6.00 | | electrified cat's-tail moss |
| **Additional species < 50% presence** | | | | | | | | |
| A | *Arbutus menziesii* | | 0.33 - 3.08 | | 0.20 - 0.10 | 0.25 - 4.50 | | arbutus |
| B1 | *Cytisus scoparius* | 0.07 - 1.29 | | 0.17 - 2.00 | | | 0.17 - 1.00 | Scotch broom |
| B1 | *Holodiscus discolor* | 0.29 - 3.43 | 0.33 - 7.33 | 0.17 - 5.75 | 0.40 - 13.80 | 0.25 - 4.50 | 0.33 - 2.00 | oceanspray |
| B1 | *Oemleria cerasiformis* | 0.07 - 0.04 | | 0.08 - 0.04 | 0.20 - 7.60 | | 0.17 - 1.00 | Indian-plum |
| B1 | *Pseudotsuga menziesii* | 0.07 - 0.43 | | | | | | Douglas-fir |
| B1 | *Rosa nutkana* | | | | | | 0.17 - 6.33 | Nootka rose |
| B2 | *Amelanchier alnifolia* | 0.14 - 1.32 | 0.33 - 1.08 | 0.08 - 0.04 | 0.20 - 1.20 | | 0.17 - 1.00 | saskatoon |
| B2 | *Arbutus menziesii* | | 0.17 - 1.00 | | 0.20 - 1.20 | | | arbutus |
| B2 | *Daphne laureola* | 0.21 - 1.75 | 0.17 - 0.08 | 0.33 - 0.17 | 0.20 - 0.10 | | 0.17 - 0.08 | spurge-laurel |
| B2 | *Holodiscus discolor* | 0.21 - 2.14 | 0.33 - 1.08 | 0.17 - 1.00 | 0.20 - 1.20 | | | oceanspray |
| B2 | *Lonicera ciliosa* | | 0.17 - 1.00 | | | 0.25 - 0.13 | | western trumpet honeysuckle |
| B2 | *Lonicera hispidula* | 0.36 - 6.61 | 0.33 - 1.08 | 0.25 - 0.58 | 0.40 - 3.70 | | 0.17 - 1.00 | hairy honeysuckle |
| B2 | *Oemleria cerasiformis* | | | | 0.20 - 0.10 | | | Indian-plum |
| B2 | *Paxistima myrsinites* | 0.07 - 0.04 | | | 0.20 - 0.10 | 0.25 - 0.13 | | falsebox |
| B2 | *Pseudotsuga menziesii* | 0.14 - 0.46 | 0.17 - 3.00 | | 0.20 - 3.60 | | | Douglas-fir |
| B2 | *Rosa nutkana* | 0.07 - 1.29 | 0.17 - 3.00 | 0.17 - 1.00 | 0.20 - 1.20 | 0.25 - 0.13 | 0.17 - 3.00 | Nootka rose |
| C | *Aira caryophyllea* | 0.21 - 0.11 | 0.17 - 0.08 | 0.08 - 0.04 | | | 0.17 - 1.00 | silver hairgrass |
| C | *Allium cernuum* | 0.36 - 0.57 | | 0.17 - 0.08 | | | | nodding onion |
| C | *Arrhenatherum elatius* | | | | | | 0.17 - 1.00 | tall oatgrass |
| C | *Bromus rigidus* | | | | | | 0.33 - 1.08 | rip-gut brome |
| C | *Bromus tectorum* | | | 0.17 - 0.54 | | 0.25 - 0.13 | 0.17 - 1.00 | cheatgrass |
| C | *Crepis* sp. | 0.14 - 0.07 | | | | | | |
| C | *Delphinium menziesii* | 0.21 - 0.50 | 0.17 - 0.08 | 0.08 - 0.04 | | | 0.17 - 0.08 | Menzies' larkspur |
| C | *Eriophyllum lanatum* | 0.29 - 0.14 | 0.17 - 0.08 | 0.08 - 0.04 | 0.20 - 0.10 | 0.25 - 0.13 | | woolly eriophyllum |
| C | *Galium aparine* | 0.14 - 0.07 | | 0.25 - 0.58 | | 0.25 - 0.13 | | cleavers |
| C | *Heuchera micrantha* | | 0.17 - 0.08 | 0.08 - 0.04 | 0.20 - 0.10 | 0.25 - 0.13 | | small-flowered alumroot |
| C | *Holcus lanatus* | | | 0.08 - 0.04 | | | 0.33 - 2.00 | common velvet-grass |
| C | *Koeleria macrantha* | | 0.17 - 0.08 | | | | | junegrass |
| C | *Lomatium nudicaule* | | | 0.08 - 0.04 | | | | barestem desert-parsley |
| C | *Lomatium triternatum* | 0.29 - 1.79 | | 0.17 - 0.08 | | | | nine-leaved desert-parsley |
| C | *Moehringia macrophylla* | 0.07 - 1.29 | | 0.17 - 0.08 | 0.20 - 0.10 | 0.25 - 0.13 | | big-leaved sandwort |
| C | *Montia parvifolia* | | | | | 0.25 - 1.50 | | small-leaved montia |
| C | *Montia parvifolia* | | | | 0.20 - 3.60 | 0.25 - 0.13 | | small-leaved montia |
| C | *Muscari botryoides* | | | | 0.20 - 0.10 | | 0.17 - 0.08 | common grape hyacinth |

| | | Qgcc | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Comm. types | | Phen. types | | | | |
| | | C47, in part | C14 | C37a | C35a | C35b | C37b | |
| Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| C | *Myosotis discolor* | 0.07 - 0.04 | 0.33 - 1.08 | 0.33 - 0.63 | | | 0.33 - 1.08 | common forget-me-not |
| C | *Osmorhiza berteroi* | 0.36 - 5.29 | 0.33 - 0.17 | 0.17 - 1.00 | 0.20 - 0.10 | | | mountain sweet-cicely |
| C | *Pentagramma triangularis* | 0.07 - 0.04 | | | | 0.25 - 0.13 | | goldenback fern |
| C | *Polypodium glycyrrhiza* | 0.21 - 0.50 | | | 0.20 - 1.20 | 0.25 - 1.50 | 0.17 - 0.08 | licorice fern |
| C | *Polystichum munitum* | 0.43 - 1.00 | | 0.33 - 0.17 | | | 0.17 - 0.08 | sword fern |
| C | *Rubus ursinus* | | 0.17 - 3.00 | | | | | trailing blackberry |
| C | *Sedum spathulifolium* | | | 0.08 - 0.04 | 0.20 - 1.20 | 0.25 - 0.13 | | broad-leaved stonecrop |
| C | *Selaginella wallacei* | 0.21 - 0.11 | | | | 0.25 - 1.50 | 0.17 - 1.00 | Wallace's selaginella |
| C | *Trifolium dubium* | | | | | | 0.33 - 3.08 | small hop-clover |
| C | *Trifolium microcephalum* | 0.14 - 0.07 | 0.17 - 0.08 | 0.08 - 0.04 | | | 0.17 - 3.00 | small-headed clover |
| C | *Veronica serpyllifolia* | 0.21 - 0.11 | 0.33 - 0.17 | 0.33 - 0.63 | | | 0.33 - 0.17 | thyme-leavedspeedwell |
| C | *Vicia americana* | 0.36 - 3.46 | 0.17 - 1.00 | 0.25 - 0.13 | 0.40 - 1.30 | 0.25 - 0.13 | | American vetch |
| D | *Eurhynchium oreganum* | 0.29 - 2.57 | 0.17 - 1.00 | 0.25 - 2.50 | 0.20 - 1.20 | | 0.17 - 1.00 | Oregon beaked-moss |
| D | *Pseudotsuga menziesii* | 0.29 - 0.14 | 0.17 - 0.08 | | | 0.25 - 0.13 | 0.17 - 0.08 | Douglas-fir |

| | | | Qggc | | | |
|---|---|---|---|---|---|---|
| | | | Comm. types | | | |
| | | | C36 | C47, in part | C13 | |
| | Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| **Trees** | | | | | | |
| | A | *Pseudotsuga menziesii* | 0.18 - 2.92 | 0.29 - 8.00 | 0.50 - 18.58 | Douglas-fir |
| | A | *Quercus garryana* | 0.72 - 32.94 | 0.71 - 40.00 | 0.75 - 40.17 | Garry oak |
| **Shrubs** | | | | | | |
| | B1 | *Quercus garryana* | 0.80 - 30.48 | 0.71 - 32.36 | 0.83 - 30.67 | Garry oak |
| | B2 | *Cytisus scoparius* | 0.66 - 10.30 | 0.57 - 3.04 | 0.58 - 5.58 | Scotch broom |
| | B2 | *Mahonia aquifolium* | 0.54 - 2.86 | 0.36 - 2.21 | 0.50 - 2.54 | tall Oregon-grape |
| | B2 | *Quercus garryana* | 0.78 - 9.73 | 0.64 - 6.89 | 0.75 - 15.04 | Garry oak |
| | B2 | *Symphoricarpos albus* | 0.84 - 16.10 | 0.64 - 16.75 | 0.50 - 8.83 | common snowberry |
| **Herbs** | | | | | | |
| | C | *Bromus carinatus* | 0.66 - 4.89 | 0.57 - 1.07 | 0.67 - 4.17 | California brome |
| | C | *Bromus hordeaceus* ssp. *hordeaceus* | 0.52 - 1.71 | 0.50 - 0.64 | 0.42 - 1.67 | soft brome |
| | C | *Bromus sterilis* | 0.66 - 5.70 | 0.64 - 5.43 | 0.58 - 7.25 | barren brome |
| | C | *Camassia leichtlinii* | 1.00 - 22.00 | 0.50 - 6.04 | 0.50 - 2.63 | great camas |
| | C | *Carex inops* | 0.24 - 0.69 | 0.71 - 10.64 | 0.42 - 2.58 | long-stoloned sedge |
| | C | *Cerastium arvense* | 0.40 - 1.56 | 0.64 - 5.64 | 0.42 - 0.67 | field chickweed |
| | C | *Claytonia perfoliata* | 0.42 - 3.05 | 0.36 - 1.36 | 0.75 - 3.67 | miner's-lettuce |
| | C | *Cynosurus echinatus* | 0.36 - 2.05 | 0.64 - 3.61 | 0.17 - 2.00 | hedgehog dogtail |
| | C | *Dactylis glomerata* | 0.62 - 10.96 | 0.21 - 1.29 | 0.50 - 3.63 | orchard-grass |
| | C | *Elymus glaucus* | 0.84 - 8.17 | 1.00 - 28.57 | 1.00 - 5.71 | blue wildrye |
| | C | *Galium aparine* | 0.86 - 6.72 | 0.93 - 9.14 | 1.00 - 9.54 | cleavers |
| | C | *Melica subulata* | 0.26 - 2.32 | 0.57 - 6.46 | 1.00 - 34.25 | Alaska oniongrass |
| | C | *Myosotis discolor* | 0.28 - 0.36 | 0.07 - 0.04 | 0.50 - 0.25 | common forget-me-not |
| | C | *Nemophila parviflora* | 0.30 - 1.51 | 0.50 - 1.82 | 0.50 - 1.17 | small-flowered nemophila |
| | C | *Osmorhiza berteroi* | 0.18 - 0.42 | 0.36 - 5.29 | 0.50 - 5.08 | mountain sweet-cicely |
| | C | *Plantago lanceolata* | 0.40 - 1.58 | 0.14 - 0.07 | 0.50 - 1.17 | ribwort plantain |
| | C | *Poa pratensis* | 0.76 - 10.24 | 0.64 - 7.07 | 0.92 - 7.88 | Kentucky bluegrass |
| | C | *Polystichum munitum* | 0.14 - 0.18 | 0.43 - 1.00 | 0.58 - 1.21 | sword fern |
| | C | *Sanicula crassicaulis* | 0.76 - 6.56 | 0.93 - 6.50 | 1.00 - 10.63 | Pacific sanicle |
| | C | *Stellaria media* | 0.42 - 1.44 | 0.36 - 1.43 | 0.58 - 2.13 | common chickweed |
| | C | *Vicia hirsuta* | 0.70 - 6.72 | 0.36 - 4.89 | 0.67 - 4.54 | tiny vetch |
| | C | *Vicia sativa* | 0.74 - 6.60 | 0.64 - 4.39 | 0.75 - 6.13 | common vetch |
| | C | *Vulpia bromoides* | 0.64 - 4.10 | 0.50 - 1.43 | 0.58 - 2.67 | barren fescue |
| **Mosses and Lichens** | | | | | | |
| | D | *Quercus garryana* | 0.76 - 2.42 | 0.79 - 2.82 | 0.75 - 2.29 | Garry oak |
| **Additional species < 50% presence** | | | | | | |
| | A | *Arbutus menziesii* | 0.04 - 0.48 | | 0.17 - 2.00 | arbutus |
| | B1 | *Amelanchier alnifolia* | 0.10 - 0.84 | | | saskatoon |
| | B1 | *Arbutus menziesii* | 0.10 - 0.84 | 0.07 - 0.43 | 0.42 - 3.50 | arbutus |
| | B1 | *Cytisus scoparius* | 0.14 - 0.75 | 0.07 - 1.29 | 0.17 - 1.00 | Scotch broom |
| | B1 | *Holodiscus discolor* | 0.28 - 5.96 | 0.29 - 3.43 | 0.33 - 6.75 | oceanspray |
| | B1 | *Lonicera ciliosa* | 0.06 - 0.03 | | | western trumpet honeysuckle |
| | B1 | *Lonicera hispidula* | 0.02 - 0.12 | | 0.08 - 0.04 | hairy honeysuckle |
| | B1 | *Oemleria cerasiformis* | 0.12 - 0.63 | 0.07 - 0.04 | | Indian-plum |
| | B1 | *Pseudotsuga menziesii* | 0.06 - 0.36 | 0.07 - 0.43 | 0.25 - 2.50 | Douglas-fir |
| | B1 | *Rosa nutkana* | 0.04 - 0.48 | | | Nootka rose |
| | B2 | *Amelanchier alnifolia* | 0.20 - 0.76 | 0.14 - 1.32 | 0.25 - 1.04 | saskatoon |
| | B2 | *Arbutus menziesii* | 0.02 - 0.01 | | 0.17 - 0.54 | arbutus |
| | B2 | *Daphne laureola* | 0.22 - 0.90 | 0.21 - 1.75 | | spurge-laurel |

Note: Presence > 0.60  0–5,  5.1–10,  10.1–25,  > 25

| | | Qggc | | | |
|---|---|---|---|---|---|
| | | Comm. types | | | |
| | | C36 | C47, in part | C13 | |
| Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| B2 | *Holodiscus discolor* | 0.34 - 3.88 | 0.21 - 2.14 | 0.25 - 2.50 | oceanspray |
| B2 | *Lonicera ciliosa* | 0.12 - 0.74 | | 0.17 - 0.54 | western trumpet honeysuckle |
| B2 | *Lonicera hispidula* | 0.20 - 1.59 | 0.36 - 6.61 | 0.33 - 5.00 | hairy honeysuckle |
| B2 | *Lycium barbarum* | 0.02 - 0.12 | | | matrimony vine |
| B2 | *Oemleria cerasiformis* | 0.22 - 0.57 | | | Indian-plum |
| B2 | *Paxistima myrsinites* | 0.02 - 0.01 | 0.07 - 0.04 | 0.08 - 0.04 | falsebox |
| B2 | *Pseudotsuga menziesii* | 0.02 - 0.12 | 0.14 - 0.46 | 0.17 - 1.00 | Douglas-fir |
| B2 | *Rosa nutkana* | 0.34 - 2.61 | 0.07 - 1.29 | 0.08 - 0.50 | Nootka rose |
| B2 | *Rubus leucodermis* | 0.08 - 0.37 | | 0.17 - 1.54 | black raspberry |
| C | *Aira caryophyllea* | 0.24 - 0.34 | 0.21 - 0.11 | 0.17 - 0.08 | silver hairgrass |
| C | *Aira praecox* | 0.22 - 1.14 | 0.07 - 0.04 | 0.08 - 0.04 | early hairgrass |
| C | *Allium cernuum* | 0.18 - 0.42 | 0.36 - 0.57 | 0.17 - 0.08 | nodding onion |
| C | *Anthoxanthum odoratum* | 0.46 - 6.71 | 0.29 - 0.93 | 0.25 - 3.04 | sweet vernalgrass |
| C | *Arrhenatherum elatius* | 0.06 - 0.73 | | | tall oatgrass |
| C | *Brodiaea coronaria* | 0.38 - 1.42 | 0.29 - 2.64 | 0.17 - 2.00 | harvest brodiaea |
| C | *Bromus rigidus* | 0.20 - 1.59 | | 0.08 - 0.04 | rip-gut brome |
| C | *Bromus tectorum* | 0.06 - 0.14 | | | cheatgrass |
| C | *Camassia quamash* | 0.22 - 1.82 | 0.14 - 1.71 | 0.08 - 1.50 | common camas |
| C | *Clinopodium douglasii* | 0.12 - 0.76 | 0.07 - 1.29 | 0.08 - 0.50 | yerba buena |
| C | *Collinsia parviflora* | 0.10 - 0.27 | | 0.25 - 0.13 | small-flowered blue-eyed Mary |
| C | *Crepis* sp. | | 0.14 - 0.07 | | |
| C | *Danthonia californica* | 0.06 - 0.14 | 0.29 - 5.00 | 0.25 - 0.13 | California oatgrass |
| C | *Delphinium menziesii* | 0.22 - 1.25 | 0.21 - 0.50 | 0.08 - 0.04 | Menzies' larkspur |
| C | *Dodecatheon hendersonii* | 0.26 - 0.46 | 0.29 - 0.14 | 0.33 - 1.08 | broad-leaved shootingstar |
| C | *Eriophyllum lanatum* | 0.02 - 0.01 | 0.29 - 0.14 | | woolly eriophyllum |
| C | *Erythronium oregonum* | 0.30 - 1.45 | 0.21 - 0.11 | 0.25 - 0.13 | white fawn lily |
| C | *Festuca roemerii* | 0.20 - 1.35 | 0.43 - 1.39 | 0.33 - 1.54 | Roemer's fescue |
| C | *Fritillaria affinis* | 0.12 - 0.06 | 0.14 - 0.07 | 0.17 - 0.54 | chocolate lily |
| C | *Galium aparine* | 0.14 - 0.18 | 0.14 - 0.07 | | cleavers |
| C | *Geranium molle* | 0.48 - 2.52 | 0.29 - 1.39 | 0.42 - 4.71 | dovefoot geranium |
| C | *Heuchera micrantha* | 0.04 - 0.13 | | | small-flowered alumroot |
| C | *Holcus lanatus* | 0.26 - 1.45 | | 0.08 - 0.50 | common velvet-grass |
| C | *Hypochaeris radicata* | 0.42 - 0.21 | 0.14 - 0.07 | 0.33 - 0.17 | hairy cat's-ear |
| C | *Lathyrus nevadensis* | 0.16 - 1.86 | 0.21 - 0.89 | 0.25 - 0.58 | purple peavine |
| C | *Lomatium triternatum* | 0.08 - 0.37 | 0.29 - 1.79 | 0.08 - 0.04 | nine-leaved desert-parsley |
| C | *Lomatium utriculatum* | 0.12 - 0.17 | 0.29 - 1.39 | | spring gold |
| C | *Lotus micranthus* | 0.14 - 0.40 | 0.14 - 0.46 | | small-flowered birds-foot trefoil |
| C | *Luzula comosa* var. *comosa* | 0.12 - 0.06 | 0.14 - 0.46 | 0.33 - 0.17 | Pacific wood-rush |
| C | *Moehringia macrophylla* | 0.12 - 0.52 | 0.07 - 1.29 | 0.25 - 1.58 | big-leaved sandwort |
| C | *Montia parvifolia* | 0.14 - 0.40 | | 0.08 - 0.04 | small-leaved montia |
| C | *Pentagramma triangularis* | 0.06 - 0.03 | 0.07 - 0.04 | 0.08 - 0.04 | goldenback fern |
| C | *Piperia elegans* | 0.06 - 0.03 | 0.07 - 0.43 | 0.17 - 0.08 | elegant rein orchid |
| C | *Plectritis congesta* | 0.20 - 0.89 | 0.36 - 0.57 | 0.17 - 0.54 | sea blush |
| C | *Polypodium glycyrrhiza* | 0.36 - 4.02 | 0.21 - 0.50 | | licorice fern |
| C | *Ranunculus occidentalis* | 0.36 - 0.62 | 0.43 - 1.00 | 0.42 - 1.13 | western buttercup |
| C | *Rhinanthus minor* | 0.04 - 0.24 | | | yellow rattle |
| C | *Rubus ursinus* | 0.08 - 0.39 | | 0.17 - 0.08 | trailing blackberry |
| C | *Rumex acetosella* | 0.34 - 0.50 | 0.43 - 0.21 | 0.25 - 0.13 | sheep sorrel |
| C | *Sedum spathulifolium* | 0.10 - 0.40 | | 0.08 - 0.50 | broad-leaved stonecrop |
| C | *Selaginella wallacei* | 0.08 - 0.15 | 0.21 - 0.11 | | Wallace's selaginella |
| C | *Taraxacum officinale* | 0.18 - 0.20 | | 0.25 - 0.13 | common dandelion |

| | | Qggc | | | |
|---|---|---|---|---|---|
| | | Comm. types | | | |
| | | C36 | C47, in part | C13 | |
| Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| C | *Trifolium dubium* | 0.36 - 1.52 | | | small hop-clover |
| C | *Trifolium microcephalum* | 0.06 - 0.03 | 0.14 - 0.07 | 0.17 - 0.54 | small-headed clover |
| C | *Trifolium oliganthum* | 0.06 - 0.03 | 0.21 - 0.11 | | few-flowered clover |
| C | *Veronica serpyllifolia* | 0.14 - 0.07 | 0.21 - 0.11 | 0.25 - 0.13 | thyme-leaved speedwell |
| C | *Vicia americana* | 0.32 - 3.08 | 0.36 - 3.46 | 0.25 - 1.04 | American vetch |
| D | *Dicranum scoparium* | 0.28 - 2.64 | 0.07 - 0.43 | 0.25 - 1.50 | broom-moss |
| D | *Eurhynchium oreganum* | 0.34 - 3.16 | 0.29 - 2.57 | 0.42 - 2.50 | Oregon beaked-moss |
| D | *Polytrichum juniperinum* | 0.06 - 0.36 | | 0.08 - 0.50 | juniper haircap moss |
| D | *Pseudotsuga menziesii* | 0.02 - 0.01 | 0.29 - 0.14 | 0.25 - 0.13 | Douglas-fir |
| D | *Racomitrium canescens* | 0.26 - 3.32 | 0.14 - 0.86 | | grey rock-moss |
| D | *Rhytidiadelphus triquetrus* | 0.20 - 4.24 | 0.21 - 2.14 | 0.33 - 5.00 | electrified cat's-tail moss |

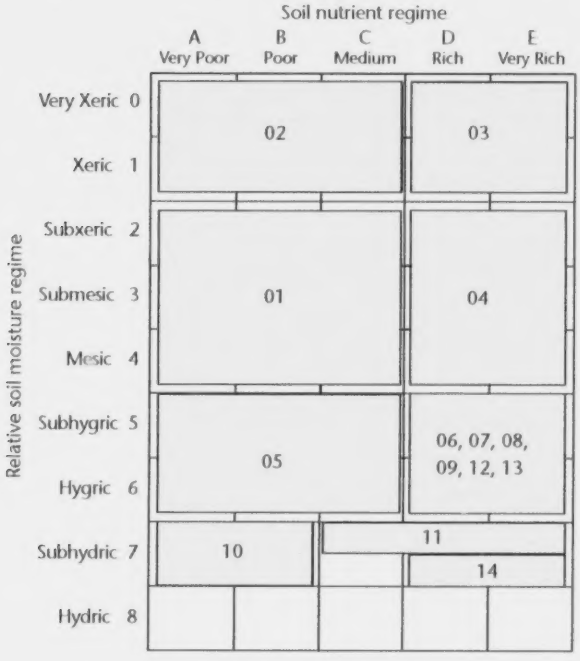
| | | | Qgos | | | | |
|---|---|---|---|---|---|---|---|
| | | | Comm. types | | | | |
| | | | C8 | C9 | C10 | C15 | |
| | Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| **Trees** | | | | | | | |
| | A | *Pseudotsuga menziesii* | 0.36 - 6.18 | | 0.80 - 9.60 | 0.33 - 5.56 | Douglas-fir |
| | A | *Quercus garryana* | 1.00 - 58.45 | 0.80 - 53.40 | 1.00 - 45.00 | 0.67 - 29.22 | Garry oak |
| **Shrubs** | | | | | | | |
| | B1 | *Arbutus menziesii* | 0.09 - 1.64 | | 0.60 - 6.00 | | arbutus |
| | B1 | *Holodiscus discolor* | 0.55 - 15.36 | 0.50 - 8.60 | 1.00 - 54.00 | 0.22 - 11.22 | oceanspray |
| | B1 | *Lonicera ciliosa* | 0.73 - 5.55 | | | 0.11 - 0.06 | western trumpet honeysuckle |
| | B1 | *Oemleria cerasiformis* | 0.36 - 2.27 | 0.90 - 18.55 | | 0.11 - 0.06 | Indian-plum |
| | B1 | *Quercus garryana* | 0.91 - 22.18 | 0.70 - 21.20 | 1.00 - 23.80 | 0.89 - 31.89 | Garry oak |
| | B1 | *Rosa nutkana* | 0.36 - 8.36 | 0.50 - 13.80 | | | Nootka rose |
| | B2 | *Amelanchier alnifolia* | 0.27 - 1.64 | 0.40 - 1.85 | 0.60 - 1.40 | 0.22 - 1.33 | saskatoon |
| | B2 | *Cytisus scoparius* | 0.45 - 2.23 | 0.20 - 0.10 | 0.80 - 2.60 | 0.78 - 6.72 | Scotch broom |
| | B2 | *Daphne laureola* | 0.45 - 5.14 | 0.80 - 2.70 | 0.40 - 1.30 | 0.22 - 0.72 | spurge-laurel |
| | B2 | *Holodiscus discolor* | 0.45 - 5.73 | 0.20 - 2.40 | 0.60 - 7.30 | 0.78 - 7.72 | oceanspray |
| | B2 | *Lonicera ciliosa* | 1.00 - 18.36 | | 0.40 - 0.20 | 0.11 - 0.67 | western trumpet honeysuckle |
| | B2 | *Mahonia aquifolium* | 0.64 - 3.91 | 0.50 - 4.85 | 0.80 - 2.60 | 0.33 - 3.33 | tall Oregon-grape |
| | B2 | *Oemleria cerasiformis* | 0.27 - 0.14 | 0.60 - 10.50 | 0.20 - 3.60 | 0.22 - 0.72 | Indian-plum |
| | B2 | *Quercus garryana* | 0.91 - 10.55 | 0.60 - 3.15 | 0.80 - 10.10 | 0.78 - 15.17 | Garry oak |
| | B2 | *Rosa nutkana* | 0.82 - 20.55 | 0.90 - 22.45 | 0.20 - 1.20 | 0.33 - 1.39 | Nootka rose |
| | B2 | *Rubus leucodermis* | 0.64 - 3.41 | 0.10 - 0.60 | 0.20 - 0.10 | | black raspberry |
| | B2 | *Symphoricarpos albus* | 1.00 - 33.91 | 1.00 - 42.80 | 1.00 - 18.70 | 0.67 - 11.56 | common snowberry |
| **Herbs** | | | | | | | |
| | C | *Anthoxanthum odoratum* | 0.18 - 1.68 | | 0.60 - 2.50 | 0.33 - 4.33 | sweet vernalgrass |
| | C | *Bromus carinatus* | 0.55 - 1.27 | 0.50 - 1.90 | 0.80 - 2.60 | 0.56 - 5.39 | California brome |
| | C | *Camassia leichtlinii* | 0.64 - 4.50 | 0.50 - 3.65 | 0.60 - 11.30 | 0.89 - 13.33 | great camas |
| | C | *Camassia quamash* | 0.09 - 1.64 | 0.40 - 5.60 | 0.60 - 6.00 | 0.11 - 0.06 | common camas |
| | C | *Carex inops* | 0.09 - 0.55 | 0.10 - 0.05 | 1.00 - 2.70 | 0.33 - 0.78 | long-stoloned sedge |
| | C | *Clinopodium douglasii* | 0.27 - 1.64 | 0.10 - 1.80 | 0.60 - 1.40 | | yerba buena |
| | C | *Dactylis glomerata* | 0.82 - 10.77 | 0.80 - 5.55 | 0.80 - 1.50 | 0.44 - 6.06 | orchard-grass |
| | C | *Elymus glaucus* | 0.82 - 4.50 | 0.40 - 1.30 | 0.80 - 1.50 | 1.00 - 6.11 | blue wildrye |
| | C | *Erythronium oregonum* | 0.27 - 0.64 | 0.40 - 1.85 | 0.80 - 5.00 | 0.44 - 1.44 | white fawn lily |
| | C | *Fritillaria affinis* | 0.27 - 0.64 | | 0.80 - 0.40 | 0.11 - 0.06 | chocolate lily |
| | C | *Galium aparine* | 0.82 - 5.09 | 0.60 - 3.05 | 1.00 - 6.20 | 0.78 - 6.11 | cleavers |
| | C | *Hypochaeris radicata* | 0.36 - 0.18 | 0.30 - 0.15 | 0.20 - 0.10 | 0.56 - 0.89 | hairy cat's-ear |
| | C | *Melica subulata* | 0.55 - 3.95 | 0.20 - 0.65 | 0.40 - 7.70 | 0.22 - 0.72 | Alaska oniongrass |
| | C | *Moehringia macrophylla* | 0.18 - 0.59 | 0.10 - 0.05 | 1.00 - 0.50 | 0.11 - 0.06 | big-leaved sandwort |
| | C | *Nemophila parviflora* | 0.09 - 0.55 | 0.10 - 1.80 | 0.60 - 3.60 | 0.11 - 0.67 | small-flowered nemophila |
| | C | *Poa pratensis* | 0.91 - 4.55 | 0.60 - 3.70 | 0.60 - 3.80 | 0.67 - 0.33 | Kentucky bluegrass |
| | C | *Polypodium glycyrrhiza* | 0.27 - 1.73 | | 0.40 - 1.30 | 1.00 - 35.22 | licorice fern |
| | C | *Rumex acetosella* | 0.18 - 0.09 | | | 0.56 - 0.28 | sheep sorrel |
| | C | *Sanicula crassicaulis* | 0.45 - 2.23 | 0.40 - 1.30 | 1.00 - 6.00 | 0.22 - 0.72 | Pacific sanicle |
| | C | *Stellaria media* | 0.09 - 0.55 | 0.20 - 0.65 | 0.80 - 1.50 | 0.56 - 1.50 | common chickweed |
| | C | *Vicia americana* | 0.36 - 1.68 | 0.10 - 0.05 | 0.80 - 1.50 | 0.11 - 0.67 | American vetch |
| | C | *Vicia hirsuta* | 0.45 - 1.23 | | 0.60 - 3.80 | | tiny vetch |
| | C | *Vicia sativa* | 0.73 - 2.86 | 0.30 - 1.25 | 0.40 - 0.20 | | common vetch |
| | C | *Vulpia bromoides* | 0.09 - 0.05 | | 0.40 - 1.30 | 0.56 - 1.50 | barren fescue |
| **Mosses and Lichens** | | | | | | | |
| | D | *Dicranum scoparium* | 0.09 - 0.55 | | 0.40 - 2.40 | 0.78 - 7.33 | broom-moss |
| | D | *Eurhynchium oreganum* | 0.36 - 4.36 | 0.50 - 7.40 | 0.40 - 4.80 | 0.44 - 4.00 | Oregon beaked-moss |
| | D | *Quercus garryana* | 0.64 - 0.82 | 0.30 - 0.15 | 1.00 - 0.50 | 0.89 - 1.06 | Garry oak |

Note: Presence ≥ 0.60  0 5,  5.1 10,  10.1 25,  > 25

| | | Qgos | | | | |
|---|---|---|---|---|---|---|
| | | Comm. types | | | | |
| | | C8 | C9 | C10 | C15 | |
| Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| D | *Racomitrium canescens* | | | 0.20 - 0.10 | 0.67 - 10.22 | grey rock-moss |
| D | *Rhytidiadelphus triquetrus* | 0.18 - 5.09 | 0.20 - 6.90 | 1.00 - 23.60 | 0.11 - 4.22 | electrified cat's-tail moss |
| **Additional species < 50% presence** | | | | | | |
| A | *Arbutus menziesii* | | | 0.20 - 3.60 | 0.11 - 0.67 | arbutus |
| B1 | *Amelanchier alnifolia* | 0.09 - 0.55 | 0.20 - 2.40 | 0.40 - 2.40 | | saskatoon |
| B1 | *Cytisus scoparius* | 0.18 - 1.09 | 0.30 - 1.80 | | 0.22 - 2.06 | Scotch broom |
| B1 | *Lonicera hispidula* | 0.18 - 0.09 | | 0.20 - 1.20 | | hairy honeysuckle |
| B1 | *Mahonia aquifolium* | | 0.10 - 0.05 | | | tall Oregon-grape |
| B1 | *Pseudotsuga menziesii* | 0.27 - 2.23 | 0.10 - 0.60 | 0.20 - 1.20 | 0.11 - 0.67 | Douglas-fir |
| B2 | *Arbutus menziesii* | 0.09 - 0.05 | | | | arbutus |
| B2 | *Lonicera hispidula* | 0.45 - 10.09 | | 0.40 - 2.40 | 0.22 - 1.33 | hairy honeysuckle |
| B2 | *Paxistima myrsinites* | | | 0.20 - 0.10 | 0.11 - 0.06 | falsebox |
| B2 | *Pseudotsuga menziesii* | 0.09 - 0.55 | | | | Douglas-fir |
| C | *Aira caryophyllea* | | | 0.20 - 0.10 | 0.33 - 0.78 | silver hairgrass |
| C | *Aira praecox* | | 0.10 - 0.60 | | 0.33 - 1.39 | early hairgrass |
| C | *Allium cernuum* | | | | 0.11 - 0.06 | nodding onion |
| C | *Arrhenatherum elatius* | 0.27 - 0.14 | | | | tall oatgrass |
| C | *Brodiaea coronaria* | 0.09 - 0.55 | 0.10 - 0.05 | 0.20 - 0.10 | 0.33 - 0.17 | harvest brodiaea |
| C | *Bromus hordeaceus* ssp. *hordeaceus* | | 0.10 - 0.05 | 0.40 - 2.40 | 0.22 - 0.11 | soft brome |
| C | *Bromus rigidus* | | | | 0.22 - 2.67 | rip-gut brome |
| C | *Bromus sterilis* | 0.27 - 0.64 | 0.40 - 1.30 | 0.40 - 2.40 | 0.33 - 0.78 | barren brome |
| C | *Cerastium arvense* | 0.27 - 0.14 | | 0.20 - 0.10 | 0.11 - 0.06 | field chickweed |
| C | *Claytonia perfoliata* | 0.18 - 1.68 | 0.20 - 1.20 | 0.40 - 11.20 | 0.44 - 2.06 | miner's-lettuce |
| C | *Collinsia parviflora* | 0.09 - 0.05 | | | 0.11 - 0.06 | small-flowered blue-eyed Mary |
| C | *Cynosurus echinatus* | 0.18 - 0.09 | 0.10 - 0.05 | | 0.22 - 0.11 | hedgehog dogtail |
| C | *Delphinium menziesii* | 0.09 - 0.05 | 0.10 - 0.05 | 0.20 - 0.10 | 0.11 - 0.06 | Menzies' larkspur |
| C | *Dodecatheon hendersonii* | 0.09 - 0.55 | | 0.40 - 3.70 | 0.11 - 0.06 | broad-leaved shootingstar |
| C | *Festuca roemerii* | | | | 0.33 - 1.39 | Roemer's fescue |
| C | *Galium aparine* | | | 0.20 - 0.10 | 0.11 - 0.06 | cleavers |
| C | *Geranium molle* | 0.18 - 0.59 | | 0.40 - 1.30 | 0.11 - 0.67 | dovefoot geranium |
| C | *Heuchera micrantha* | 0.09 - 0.05 | 0.10 - 0.05 | 0.20 - 0.10 | 0.11 - 0.06 | small-flowered alumroot |
| C | *Holcus lanatus* | 0.45 - 0.73 | 0.20 - 0.65 | | 0.11 - 0.67 | common velvet-grass |
| C | *Lathyrus nevadensis* | 0.27 - 4.55 | 0.30 - 1.25 | 0.40 - 2.40 | 0.33 - 0.78 | purple peavine |
| C | *Lomatium utriculatum* | 0.09 - 0.05 | 0.10 - 0.60 | 0.40 - 0.20 | 0.11 - 0.06 | spring gold |
| C | *Lotus micranthus* | | | | 0.11 - 0.06 | small-flowered birds-foot trefoil |
| C | *Luzula comosa* var. *comosa* | 0.09 - 0.05 | | 0.20 - 1.20 | 0.11 - 0.06 | Pacific wood-rush |
| C | *Montia parvifolia* | | 0.20 - 1.20 | 0.20 - 0.10 | 0.11 - 0.06 | small-leaved montia |
| C | *Myosotis discolor* | 0.09 - 0.05 | | 0.40 - 0.20 | | common forget-me-not |
| C | *Osmorhiza berteroi* | 0.45 - 1.73 | 0.20 - 0.65 | 0.40 - 0.20 | 0.22 - 0.11 | mountain sweet-cicely |
| C | *Piperia elegans* | 0.18 - 0.09 | | 0.40 - 0.20 | 0.11 - 0.06 | elegant rein orchid |
| C | *Plantago lanceolata* | 0.45 - 0.23 | 0.10 - 0.60 | 0.20 - 0.10 | 0.11 - 0.06 | ribwort plantain |
| C | *Plectritis congesta* | | | 0.40 - 0.20 | 0.22 - 0.11 | sea blush |
| C | *Polystichum munitum* | 0.18 - 0.09 | 0.40 - 0.75 | 0.40 - 0.20 | | sword fern |
| C | *Ranunculus occidentalis* | 0.18 - 0.09 | 0.10 - 1.80 | | 0.11 - 0.06 | western buttercup |
| C | *Rubus ursinus* | 0.45 - 8.64 | 0.40 - 1.85 | 0.20 - 0.10 | 0.11 - 0.06 | trailing blackberry |
| C | *Sedum spathulifolium* | 0.09 - 0.05 | | 0.20 - 0.10 | 0.33 - 0.17 | broad-leaved stonecrop |
| C | *Selaginella wallacei* | | | | 0.11 - 0.67 | Wallace's selaginella |
| C | *Taraxacum officinale* | 0.09 - 0.05 | 0.40 - 0.20 | 0.20 - 0.10 | | common dandelion |
| C | *Trifolium dubium* | 0.09 - 0.05 | 0.10 - 0.05 | 0.20 - 1.20 | | small hop-clover |

| | | Qgos | | | | |
|---|---|---|---|---|---|---|
| | | Comm. types | | | | |
| | | C8 | C9 | C10 | C15 | |
| Layer | Scientific Name | Pres - Cover | Pres - Cover | Pres - Cover | Pres - Cover | Common Name |
| C | *Trifolium microcephalum* | | | 0.20 - 1.20 | | small-headed clover |
| C | *Veronica serpyllifolia* | 0.09 - 0.05 | | | | thyme-leaved speedwell |
| D | *Arbutus menziesii* | 0.09 - 0.05 | | | 0.11 - 0.67 | arbutus |
| D | *Polytrichum juniperinum* | | | 0.20 - 0.10 | 0.44 - 6.22 | juniper haircap moss |
| D | *Pseudotsuga menziesii* | 0.27 - 0.14 | | 0.20 - 0.10 | 0.11 - 0.06 | Douglas-fir |

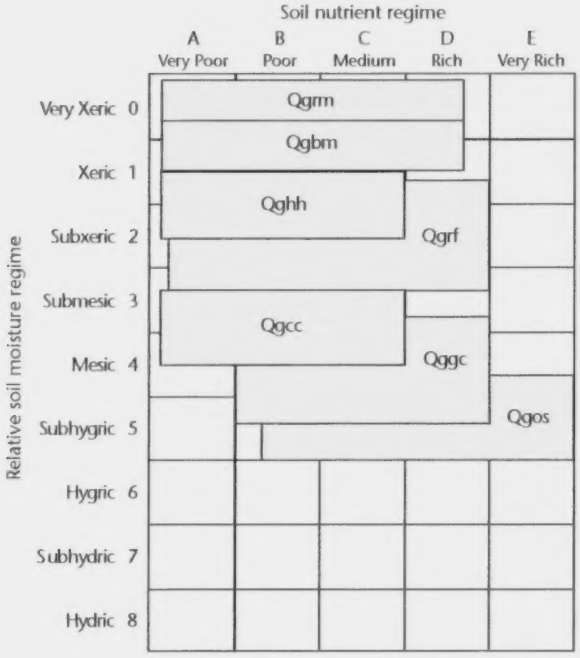
### CDFmm Forested Site Series Edatopic Grid




### Codes and Names for CDFmm Forested Site Series

01 Fd – Salal
02 FdPl – Arbutus
03 Fd – Oniongrass
04 FdBg – Oregon-grape
05 CwFd – Kindbergia
06 CwBg – Foamflower
07 Cw – Snowberry
08 Act – Red-osier dogwood
09 Act – Willow
10 Pl – Sphagnum
11 Cw – Skunk cabbage
12 Cw – Vanilla leaf
13 Cw – Indian-plum
14 Cw – Slough sedge

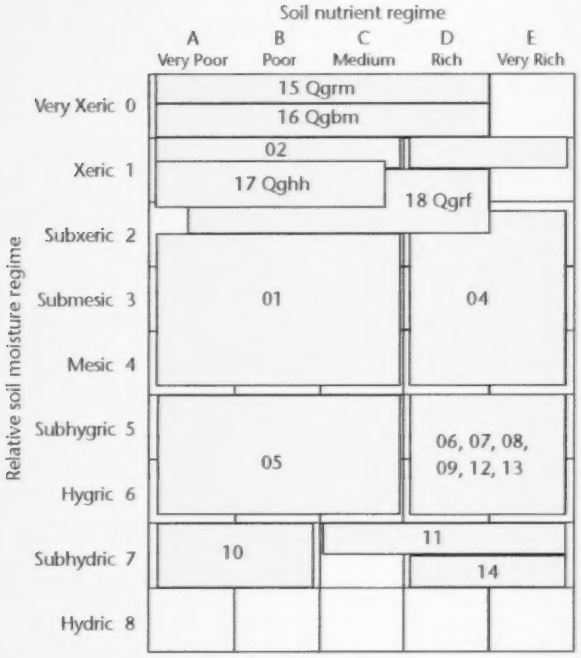
**Generalized Distribution of Garry Oak Plant Associations on Edatopic Grid**




**Codes and Common Names for Garry Oak Plant Associations**

| | |
|---|---|
| Qgrm | Garry oak – Grey rock-moss – Wallace's selaginella plant association |
| Qgbm | Garry oak – Broom-moss plant association |
| Qghh | Garry oak – Hairy honeysuckle plant association |
| Qgrf | Garry oak – Roemer's fescue plant association |
| Qgcc | Garry oak – Common camas – Blue wildrye plant association |
| Qggc | Garry oak – Great camas – Blue wildrye plant association |
| Qgos | Garry oak – Oceanspray – Common snowberry plant association |

**CDFmm Forested Site Series Edatopic Grid with Proposed Garry Oak Ecosystems**




**Proposed Treatment of Garry Oak Plant Associations in Biogeoclimatic Ecosystem Classification (BEC)**

**New Site Series**

15 Garry oak – Grey rock-moss – Wallace's selaginella (Qgrm)
16 Garry oak – Broom-moss (Qgbm)
17 Garry oak – Hairy honeysuckle (Qghh)
18 Garry oak – Roemer's fescue (Qgrf)

**Seral‡ Associations**

Qgcc §Garry oak – Common camas – Blue wildrye seral plant association
Qggc §Garry oak – Great camas – Blue wildrye seral plant association
Qgos §Garry oak – Oceanspray – Common snowberry seral plant association

‡ In the BEC context, seral is a placement in comparison to climax Douglas-fir forest on circum-mesic sites. In other contexts, the Garry oak ecosystems could be interpreted as a disclimax or as a climax within a smaller geographic scale, both within a natural disturbance regime.

**Example of How To Use Seral Association Codes**

The seral association codes are appended to the site series code. For example, the Garry oak – Common camas – Blue wildrye seral plant association overlaps mostly with the 01 site series. The seral code is appended to the site series code, separated by a hyphen: **01-Qgcc**.

**Diameter Classes**

Diameter classes are given for oak (diameter at breast height) as follows: small, 0–29 cm; medium, 30–49 cm; large, ≥ 50 cm. Diameters were taken at 50 cm on oaks < 2 m tall and at 20 cm on oaks < 0.5 m tall.

**Preservation Priority**

Preservation priority is the most important interpretive category and should be considered first in the assessment of an area. We assigned rankings to the plant communities based on the following scale, which we developed to emphasize the composition of native species:

| | |
|---|---|
| **Very high:** | – native plant communities of bedrock outcrops. |
| | – other native plant communities. |
| | – early season native plant communities. |
| **High:** | – early season native plant communities with a possible. |
| | – natural understorey succession role. |
| **Moderately high:** | – first-order disturbance plant communities that are dominated partly by native species. |
| **Moderate:** | – second-order disturbance plant communities that are dominated partly by native species. |
| **Low:** | – the remainder of the first-order disturbance plant communities. |
| **Very low:** | – the remainder of the second-order disturbance plant communities. |

The assignment of preservation priority should be further refined by considering geographic area. A generalized rating of susceptibility to destruction (threats) takes into account each geographic area. Meeting the objective of preserving whole landscapes and the deep soil parkland types would require an adjustment in the ratings. A site-specific assessment could add other factors, such as composition of native species.

**Regeneration**

Observed regeneration was used to assess oak regeneration potential. Seedlings and saplings are described separately. We used the low shrub layer, as above, to delineate the "sapling" class. The tall shrub layer could not be used because it included adult oaks. The statement about the presence of regeneration used the presence class requirement above: all sites, 1.0; most sites, < 1.0 but ≥ 0.70; some sites, <0.70. Stocking categories were as follows: "Non-stocked," no seedlings or saplings; "Lightly stocked," averaged cover class 1; "Moderately well-stocked," averaged class 2; "Well-stocked," averaged class 3 or greater.

**Aesthetic appeal**

Physiognomic types were assigned aesthetic classes. The physiognomic types were given aesthetic ratings as follows, from highest to lowest: open parklands, krummholz sea-edge, oak – light shrub cover – herb parkland, oak – talus; shrub oak – rock outcrop, other parklands, shrub oak basin; oak woodlands, oak – fern rockland, shrub oak – basin broomland, shrub oak – broom – rockland; broom parkland, shrub oak – thicket, oak –dense shrub. Ratings were reduced by a class for first-order disturbance (invasive alien) communities.

An overall rating was developed numerically from classes developed in four categories: physiognomic type, oak form-class, form-complexity index, and diameter. Oak form-class emphasized openness and, together with average diameters, indexed the positive aesthetic characteristics of large size. Oak form-complexity was computed numerically and the values used in classes, based on our assumption that the greater the complexity, the greater the aesthetic appeal. Physiognomic type classes reflected the properties of diversity and openness. The assessments were modified with factors such as the presence of early season flowering plant communities.

**Susceptibility to disturbance**

The plant communities were rated for susceptibility to disturbance using the generalizations suggested by the consolidated categories and ecological moisture regime. This assessment included susceptibility to grazing and recreational impact. Categories were assigned in the following order, from highest to lowest susceptibility: native "xeric" communities and native early season communities; other native communities and first-order disturbance "xeric" communities; "xeric" broom communities; remainder of first-order disturbance (invasive alien) communities; native "wet" communities; and remainder of broom communities.

**Prescribed fire potential**

The need of the plant community for prescribed fire was assessed, then the desirability, contraindicated by the presence of responsive species ready to take over the plant community. Shrub density and possible forb rejuvenation in grass stands were the main positive vegetation indicators. It is recommended that a number of site-specific considerations, such as fuel loads, stand structure, fire weather/season of burn, and potential containment, also be considered in any evaluation, using standard methodologies.

The prescribed fire interpretations are based on the important role suggested for periodic burning in the oak ecosystem. The basic framework for the prescribed fire assessment was as follows, from highest to lowest: moderate to dense shrub communities and early season communities; other parklands with shrub communities or dense introduced grasses; rock outcrop types; some "xeric" or talus communities with bedrock; broom communities; and "wet" shrub communities.

**Threats**

Threats addressed are those posed by development. Many of the points above were considered, along with geographic area, slope, and presence of bedrock as an indicator of view home locations. The geographic area assessment rated the areas in the following order of threat, from highest to lowest: Saanich Peninsula, western shore, Nanaimo–Duncan, southern Gulf Islands, and northern Gulf Islands. Locality-specific considerations are better built into detailed planning levels, such as proximity to municipal water, sewage systems, and transportation corridors.

**Restoration potential and priority**

Providing that communities had a high restoration potential, restoration priority parallelled preservation priority. The ratings for native plant communities assume a level of site disturbance from which recovery would be required. Lower priority was designated for plant communities with lower restoration potential. In addition to native communities and the two orders of disturbance (invasive alien) communities, site quality was considered through the use of ecological moisture regime.

Priority was assigned in the following order, from highest to lowest: native communities of mesic sites and early season native communities; introduced communities of mesic sites with native species; remaining native communities and introduced communities of mesic sites; remaining first-order communities; and xeric introduced communities; and remaining broom communities.

Potential was assigned in the following order, from highest to lowest: native wet, mesic, and early season communities; native subxeric and xeric communities; disturbed communities with native species; remaining communities.